A STUDY OF THE READING ABILITIES AND HABITS, IN ENGLISH AND ARABIC, OF BAGHDAD UNIVERSITY STUDENTS

by

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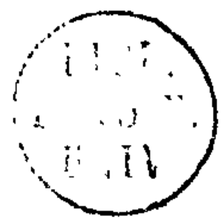

ABSTRACT

The present investigation is concerned with the relationships between reading abilities in a foreign language and reading abilities in a mother tongue. A group of 574 students at Baghdad University was taken as an example.

In Part One, Chapters I, II and III of this thesis, the nature of reading abilities, as defined by authorities in the field, is described; previous studies in the field are reviewed, and the importance, purpose, and scope of the present investigation are presented.

To answer the hypothesis of this study, four reading tests are constructed. In Part Two, Chapter IV, a description of the tests and the sampling procedure of the colleges and the students is given. Chapter V provides an account of the tests' standardizations. In Chapter VI the administration of the test to four groups - one first-year and three fourth-year - of Baghdad University students is reported.

Part Three gives a detailed analysis and explanation of the results of the four reading tests. Statistical methods, such as means, and their tests of significance, standard deviations, frequency distribution, percentages, correlations and component analysis are applied.

In all the four component analyses, a general component and some specific components are identified. Speed-recognition tests are separated from the

comprehension tests. The specific components are very clear in the rotated components.

The main findings are:

1) Strong relationships between the Arabic general and comprehension abilities and the English general and comprehension abilities, especially among able students.

2) An absence of relationship between speed of reading English and speed of reading Arabic.

3) The recognition ability of the able students in both languages is related.

4) The difficult and easy items in one language show the same tendency in the other language.

The additional findings are:

1) Iraqi students are slow readers and word-by-word readers in both English and Arabic.

2) They are efficient in answering straight forward questions and inefficient in answering questions requiring inferential answers.

ACKNOWLEDGEMENT

I am indebted to too many people, directly and indirectly, to mention them all by name. Throughout this study references have been made to many of them. My thanks are due to all.

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departments, who kindly helped to administer the tests.

To all students, English and Iraqi, who voluntarily took the tests, I owe a debt of thanks.

DEDICATION

I affectionately and gratefully dedicate this work to my mother, who made me live in order to acquire knowledge, and my Professor, who helped me to acquire knowledge in order to live, and to all fellow teachers, learners, and seekers of knowledge.

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PART ONE

THE PROBLEM

"... the term - 'able to read' is taken to mean more than ability to mouth a few words from a specific book."

(Gardner, 1965, p.11)

"Reading, we are told, can be a golden key to open golden doors - a truism. But it is a truism only for those who are lucky and clever enough to search for it and find it."

(Lefevre, 1962, p.15)

CHAPTER I

DEFINITION AND NATURE OF READING ABILITIES AND HABITS

What is an ability?

> "An ability is a trait which is defined by what an individual can do." 1

What is reading ability?

According to Thurstone's definition of ability, reading ability is, then, a purposeful activity, because reading is knowing what to do with a printed page. Reading, thus, is a combined physical and mental activity. The pictures of the printed figures of a page are formed by the reader's eye and reflected to the brain, but it is the brain that gives those pictures meaning. It is, however, true that a brain without having clear pictures cannot supply the reader with meanings, and yet pictures without the meanings, provided by the brain, have hardly any significance. Hence, reading means getting meaning from certain combinations of letters, words, phrases, sentences, paragraphs, chapters, and even whole books perceived by the eye.

Reading is a 'complex activity'. Since this is so, it is in order here to ask: 1) What precisely do authorities in the field of reading mean by reading? What is reading to them? 2) What does the process of reading

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1. Thurstone, L.L., 1947, p.62.

consist of? 3) What skills are involved in reading? 4) What is an effective reading and an efficient reader? 5) What does reading mean to certain nations?

So much has been said already in answer to these questions, but it is useful to add yet another approach to answering them to the very vast existing field of literature. Very few quotations, out of the available wealth, may be of great help to give an idea of the meaning of reading:

> " - and by reading I mean getting the meaning of words formed by letters on a printed page, and nothing else." 1
>
> "Clearly the purpose of reading is 'thought getting'..." 2
>
> "The authors of the most widely used text books during all the last three hundred years have consistently stressed the need to comprehend the meaning of what is read." 3
>
> "Unless this element of meaningfulness is present reading is a barren business." 4
>
> "To summarize, we may define reading as the act of responding appropriately to printed symbols." 5
>
> "Reading skill is a complex of abilities and includes visual perception and visual discrimination,

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1. Flesch, Rudolf, 1955, p.110.
2. Fieldhouse, A.E., 1957, p.14.
3. Fries, C.C., 1963, p.93.
4. Gardner, Keith, 1965, p.5.
5. Harris, Albert J., 1961, p.10.

auditory perception and auditory discrimination, association of visual and auditory material, linguistic ability and a capacity for the detailed analysis of the sound structure of individual words." 1

"Reading is knowing where to look to discover main ideas and supporting details." 2

"My basic assumption is that reading must be regarded as language-related process; reading and the teaching of reading must rigorously be studied in relation to language." 3

"Reading is thinking." 4

"But reading is not only thinking. It is also evaluating the material read and defining the author's purpose in writing and your purpose in reading." 5

"Critical reading is reading at its very best." 6

"A broad view of the nature of reading is that it involves the recognition of the important elements, including accuracy and thoroughness in comprehension." 7

"The highest level of reading demands that the reader not only understand and retain the information resident upon the printed pages and that he acquire this quickly and efficiently but that he contribute something on his part, from his fund of general knowledge, to the words and thoughts of the author, so that what the author has written added meaning to the mind of the reader." 8

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1. Lee, T., 1965-66, p.10.
2. Leedy, Paul, 1956, p.3.
3. Lefevre, Carl, 1962, p.XII.
4. Thorndike, Quoted by Leedy, 1956, p.13.
5. Leedy, P., 1956, p.13.
6. Ibid., p.251.
7. Barbe, W.B., 1965, p.47.
8. Leedy, Paul, 1956, p.36.

"Today intelligent reading involves the highest degree of mental activity that the individual is capable of exercising if he is to understand the meaning the author intended to impart." 1

"At the most advanced level good reading requires skill in recognizing groups of words quickly, assessing their importance to the meaning of the passage, and keeping in mind the author's pattern and train of thought." 2

"Reading is not one skill, but a large number of interrelated skills which develop gradually over a period of many years." 3

This, then, is what reading means from the points of view of different writers.

The Reading Process

From the definitions about reading at hand, it is quite clear that reading abilities can only be achieved in stages which extend from kindergarten through secondary school and university; and even accompany an individual into his career life.

The first stage of the act of acquiring the reading skills starts with the auditory representatives of a language, which a child gets familiar with by a regular listening to his bed-time stories. Gardner[4] suggests that a child at

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1. Massey, W.J., 1965, p.22.
2. McKillop, A., and Yoloye, E.A., 1962, p.102.
3. Harris, A.J., 1961, p.10.
4. 1965, p.16.

this stage, and before he or she can read, should require the following qualities: 1) A reasonable speech vocabulary. 2) Adequate accuracy in ennunciation. 3) The ability to follow a sequence of ideas. 4) The perceptual maturity to recognise the many patterns contained in the printed words. 5) The ability to differentiate the sounds which make up our spoken language. 6) An expanding world of experience and interest. According to Gardner, experience in receiving meaning through spoken language should preceed the teaching of reading; and it certainly comes before success in reading. A child must be given an opportunity to talk and discuss, express ideas and put forward suggestions, to prepare him to start learning to read. Thus words in print are meaningless unless they are used and known by the child in his speech. This stage is followed by a transfer stage during which a child shifts from the auditory signs of the language to the visual signs.

The second stage in building up the reading skills starts with reading aloud, or "barking at print" as Sir John Adams describes it. Reading in this sense consists of a skill to recognize letters in words and produce their appropriate sounds. "If one is to read with comprehension the graphic representations of the language signals, he must learn to supply those portions of signals, which are not in graphic representation."[1] The unseen signals in the graphic representation of the English language are, obviously, the sounds

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1. Fries, C. C., 1963, p. 130.

that represent the written figures, their stress, and intonation. The unseen signals in Arabic are the grammatical signals. To read English, then, is to know the sounds of the letters and be able to produce them correctly. To produce the sounds of the English language must not be difficult for an English child who has learned to produce them when he learned to talk. Flesch says: "Teach the child what each letter stands for and he can read."[1] This would be perfectly true if the English language was a perfectly phonetic language, the teaching of sounds creates a problem which arises from the fact that sounds are different from spelling. English has no letter to letter sound correspondence. A word is not pronounced the way it is spelled.

Many researches are devoted to the solving of this problem in Britain and the U.S.A. To mention a few, the following are some of the studies: 1) "Spelling Irregularity and Reading Difficulty";[2] 2)"A Study of the influence of the System of Writing Upon the Development of Reading Skills";[3] 3) "Words in Colour";[4] 4) "The I.T.A. Reading Experiment";[5] 5) "The Effect of Typography Upon Perceptual Span in Reading";[6] "Spelling Ability in

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1. 1955, p.3.
2. Lee, W.R., 1960.
3. Gaspar, R., 1966.
4. Gattengno, C., 1962.
5. Downing, J., 1964.
6. Paterson, D.G., and Tinker, Miles, American J. Psychology, LX, July 1947, pp.388-396.

Relation to Reading and Vocabulary Achievements";[1] 7) "An Investigation of Certain Relationships of Spelling with Reading and Academic Aptitude".[2]

To teach reading English, it seems that one has to separate the teaching of sounds from the spelling. In a language of a phonetic alphabet (such as Arabic), all a teacher has to do is to break a word down into its sounds that are represented by the letters and make the child aware of the individual sounds that stand for the letters. The process of learning to read and produce the sounds of English are especially difficult for the learners of English, who, having a phonetic language, pronounce each letter of a word by habit. There is hardly any difficulty in pronouncing the English consonants. The problem starts with pronouncing the vowel sounds, where each is represented by several letters and each letter has many different sounds.

Different methods have been attempted to teach the English-speaking children a better and a quicker way of reading. "Two distinct approaches in teaching reading are apparent, although even a cursory examination of current literature would lead one to believe that the list was unlimited. Referred to sometimes as 'schools of thoughts', one is the school of skills and the other the schools of interest."[3] The two widely used methods in Britain are

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1. Russell, D.H., Elementary English Review, XXXIII, Jan. 1946, pp. 32-37.
2. Townsend, A., J. Educ. Research, XL, Feb. 1947, pp.465-471.
3. Barbe, W.B., 1965, p.73.

the phonic method and the "look-and-say" method. The two other modifications of the phonic methods are "Words in colour" and the i.t.a. project. The i.t.a. method of teaching reading has a special alphabet in which every sound corresponds to a symbol. Barbe[1] states that research data at present is not adequate for a final solution of the problem. Richard Bourne[2] recently reported the success of the i.t.a., after four years of research, in teaching children to read quicker and better, over the "Look-and-say" method. Beatrix Tuder-Hart, who was responsible for 400 students taught reading experimentally by the phonic method, was quoted as saying: "Young children can learn 42 letters and their sounds and can build monosyllabic nouns meaningfully at a slightly younger age and in the same period of time as they can learn 52 words by sight. Among very bright children there are seven times as many who learn to read 'phonically' in one month as there are who can memorize 52 words by sight in that time, without learning to read." She also pointed out a disadvantage of teaching by these two methods. She said that dyslexia, word blindness, is a characteristic of 5.5% of those who begin learning with "look-and-say", while 5% of 'phonic' children showed difficulty in achieving sight reading after word building. It is only natural, then, for an Iraqi learner of English to be confused and slow when asked to practice sight-reading. "Native speakers

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1. Ibid., p.8.
2. The Guardian, Tuesday, January 14th, 1969, p.1, col. 1.

of English who read English satisfactorily but who know no foreign language whatever similarly pronounce foreign words, with which they are confronted, in accord with these major spelling-patterns."[1] Lefevre[2] proposed a new method of teaching reading at this stage and called it the new sentence method which actually is an extension of the previous word method of teaching reading. However, he suggested the application of linguistic description of American English sentences spoken to their written counterparts.

The third stage of the process of reading is 'thought getting' and vocabulary expanding. Reading is not only words' calling. Even a child reads in meaningful sentences; but of course, they are short and simple. To get meaning out of these simple and short sentences needs a skill. The question, here, is what skill is needed? The skill needed is comprehension; the skill to know, the way words are used in relation to each other which contains meaning, plus the meaning involved in each single word. Hence, comprehension means structure plus vocabulary. C. C. Fries dévides the meanings conveyed by any type of speech, spoken or written, into three categories: 1) meaning attached to lexical items; 2) meaning attached to grammatical signals, and 3) meaning attached to cultural signals. A complete and full meaning of the English language to him "consists always of the linguistic

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1. Fries, C.C., 1963, p.182.
2. 1962, p.XVII.

meanings, plus the social-cultural meaning". To comprehend what one reads, language must come first. Messages are sent and received through signals; and language is the code of these signals. The English language code, as many other languages, has many important layers of signalling patterns. For analysis and discussion, it is possible to separate these layers, but in the actual operation of language through speech, reading, or writing, they supplement each other and constitute a unified system of signals. As has already been said, these layers consist of meanings carried by sound signals, lexical signals, and structural signals. These are not the only signals of meanings; but, as we have seen, there is a layer of the signalling, of social-cultural meanings, 'the silent language'. Thus the foundation of meanings, derived from speech, reading, and writing, should be firmly built by understanding the nature of language and mastering its functioning. Hence one can read and comprehend as fast as, and as well as, one can respond to the linguistic and cultural meanings that the language graphic shapes represent.

Though the mastery of the grammatical structure of a language is very important, vocabulary is important too,to comprehend any kind of text at all levels of difficulty. Lack of understanding of word meaning and errors in word recognition are probably a direct cause of faulty comprehension even at the advanced stages, because "A minimum essential for comprehension in

reading is an understanding of the words used by the author."[1] But to comprehend a text does not necessarily demand a wide vocabulary. Ernest Horn[2] estimated that a vocabulary as large as 3,000 - 4,000 words accounts for 98 per cent of all the written language of adults. The difficulty that an Iraqi learner faces in getting the correct meanings of English words lies in the fact that many English words have as many as 8-12 different uses. A simple word such as 'mark' can mean normal standard, target, a trace left by something, a stain, a unit in evaluating a work, notice, assign mark of merit to, and act as scorer in games. The opposite is true with Arabic words. One meaning can be expressed by many words. A horse, for example, has hundreds of names in Arabic.

The reading material becomes more complicated as the child passes the beginning stages of reading. Word recognition becomes more automatic; reading vocabulary, which is a necessary phase of good reading, becomes wider and out of the reader's range of experience; sentences become longer and their structure grows more complex; the ideas involved in the reading material reflect much deeper thought than the conversation to which a child is used. This quite obviously makes the reading programme of the primary school of crucial importance. Since, it is in the primary school that the foundation of the later reading should be first established and rapidly achieved,

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1. Harris, A.J., 1961, p.397.
2. Quoted by Singleton, in Oscar, 1960, p.73.

the child should be able to: 1) work out successfully the pronunciation of many familiar words; 2) read silently with good comprehension; 3) read at a rate faster than oral reading; 4) do factual reading at a simple level in text books and references; 5) start on reading for pleasure.[1]

To keep up with the reading material which gradually increases in difficulty of many kinds, the reader, then, should improve his reading skills at a regular pace. He has, first of all, to become a sight reader in order to improve his speed, "for high speed reading is merely the logical development of good reading."[2] Since a fast reader is a sentence reader, and a sentence reader is a thought reader, then the good reader must be the fast one."Slow reading often provides distraction which may take the form of semi-day dreams about a word which has association for them, or of worries about whether they have understood what they are reading, causing them to regress, to turn back, and often to lose by such distractions."[3] The faster a reader is, the less distracted he is. A highly fast reader is never troubled by distractions such as those mentioned above. He is, in fact, too absorbed in his reading to have any spare time to pay attention to anything else. His mind is fully occupied. The reading material is presented to the brain at the speed which it can absorb. Fast readers get meaning easily from a page simply because they

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1. Harris, A.J., 1961, p.86.
2. Bayley, Harry, 1957, p.17.
3. Ibid., p.20.

read phrases and see words as groups where the meaning is found. Meanings are not contained in single words. And this is why slow readers are usually bad readers.

Although the last stage of reading can, then, be described as the act of 'getting thoughts' fast, it is by no means as simple a process as that. Different writers ascribe different numbers of skills to the reading process in general and to each of its major parts, speed and comprehension, in particular. Speed has many kinds of rates which, demanding different levels of skills, depends on the difficulty of the material being read, and the reader's experience and background knowledge.

The Skills Involved in Reading

Reading, as has been pointed out earlier, is not a unitary skill. It consists of two main skills: 1) speed; 2) comprehension. Each consists of many skills.

Skills of Speed

To read fast, one needs many skills which can be acquired and improved by training at different ages.[1] The first of these skills is to make few stops and use wide eye-spans, while reading. The wider the eye-span, the less stops the eye makes, and consequently the faster a person reads. To stop vocalization, when reading, is another very important skill that, only

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1. Mcintyre, 1935, p.13.

few are capable of, speeds up reading. If one is unable to cut it out altogether, one certainly is able to cut it down to a great extent. It is vocalization that holds the reader back. One cannot possibly read fast, when one reads at the speed of reading aloud by pronouncing each letter of a word. Since "It is quite possible to look at the printed words and get the idea directly",[1] it is worthwhile trying to eliminate vocalization in older readers by reminding them to do it consciously. If they can't help talking to themselves, it is better to talk about what is being read than repeating what is written down. To know where to cast one's eyes is yet another skill. If one casts one's eyes near the margins of a page, part of one's first eye-span includes the left margin, and part of his last eye-span includes the right margin of the page where there are no words at all. Thus one has to adopt an economical movement for one's eyes which saves one a lot of effort.

Kilby[2] classifies the skills of fast reading into three main divisions: 1) Efficient mechanical habits. 2) Knowledge of an author's outline. 3) Paragraph organization. He expands the meaning of efficient mechanical habits to include absence of: 1) hinderances of word meaning; 2) frequent regressions; 3) vocalization; 4) inability to find the first word in the next line on the return sweep. It is quite apparent that this four-fold approach to reading rapidly, suggested by Kilby, must proceed simultaneously as a reader

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1. Fry, E., 1965, p.14.
2. 1945, p.520.

advances along the line of a printed page. Leedy adds skimming as another skill to rapid reading. Skimming to him is "a well defined reading skill: a highly selective progress of looking at a page so that the reader is able to grasp quickly that for which he seeks."[1]

In the previous paragraphs the necessity of eye-span and non-vocalization were stressed for speeding up reading. Sounds, words, and structural patterns are even more important for increasing rate of reading with improving comprehension.

Mastering the skills that increase reading speed does not mean that a fast reader has only one speed for all sorts of reading material, "Good readers can go fast when they want to and they can go slowly when they want to."[2] If a reader surveys the material he reads in the course of his daily life, he readily realises how greatly they vary in the difficulty of matter and material. The cardinal point, then, is not to read everything at the same speed, but to read everything as fast as possible to get meaning out of it. Hence, one should have, and an able reader certainly has, variable speeds of reading to cope with material of different levels of difficulty. This type of reading according to J. B. Barclay's comments, "that effective reading meant spending no more time over a letter or a report than was necessary to get out of it what

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1. 1956, p. 178.
2. Fry, E., 1965, p.62.

was required",[1] is effective reading.

The Skills of Comprehension

The main concern, up to now, was mainly speed of reading which represents the physical side of the reading activity. The other, and most important, skill involved in reading is comprehension which "is entirely a mental process, the nature of which is not clearly understood, but the connection between fast and efficient reading and good comprehension was noted by pioneer enquirers into the nature of reading process."[2]

Although authorities in the field of reading agree that the most important factor in reading process is comprehension, yet there are notable varieties of ideas concerning the skills involved in reading comprehension. Fredrick B. Davis classifies reading skills (comprehension) as follows: "1) knowledge of word meanings. 2) Ability to select appropriate meaning for a word or phrase in the light of its particular contextual setting. 3) Ability to follow organization of a passage and to identify antecedents and references in it. 4) Ability to select the main thought of a passage. 5) Ability to answer questions that are specifically answered in a passage. 6) Ability to answer questions that are answered in a passage but not in the words in which

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1. University of Edinburgh Gazette, No. 17, 1857b, pp. 15-17.
2. Bayley, Harry, 1957, p. 20.

the question is asked. 7) Ability to draw inferences from a passage about its content. 8) Ability to recognize the literary devices used in a passage and to determine a writer's purpose, intent, and point of view, i.e. to draw inferences about a writer."[1]

A.J. Harris[2] groups reading skills into three major categories: 1) Developmental reading. 2) Functional reading. 3) Recreational reading. He, then, specifies the skills that belong to each of the main types of the reading. He lists under: 1) Developmental reading, the following: A) Skill in the mechanics of reading: a) Development of a large sight vocabulary; b) Development of skill in identifying unfamiliar words; c) Good eye-movement habits; d) Development of proper habits of posture, holding books, and so on; e) Speed and fluency in silent reading; f) Development of oral reading skills; phrasing expression, pitch, volume, enunciation. B) Skills in reading comprehension: a) Acquisition of a rich, extensive and accurate vocabulary; b) Ability to grasp the meaning of units of increasing size; phrase, sentence, paragraph, whole section; c) Ability to find answers to specific questions; d) Ability to select and understand main ideas; e) Ability to understand a sequence of events, f) Ability to note and recall details; g) Ability to grasp the organization of the author's plan; h) Ability to follow directions accurately; i) Ability to evaluate what one reads; j) Ability

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1. Quoted by Vaughn, K.W., in Lindquist, 1951, pp.164-165.

2. 1961, p.12.

to remember what one has read. 2) Functional reading: A) Ability to locate needed reading material. B) Ability to comprehend informational material. C) Ability to select the material needed. D) Ability to organize what is read: a) Ability to summarize and outline. 3) Recreational reading:

A) Development of liking for reading as a voluntary leisure-time activity.

B) Development of ability to locate interesting and enjoyable reading matter.

C) Satisfaction of present recreational interests and tastes through reading.

D) Development of more varied, more mature, and more refined reading tastes.

E) Development of liking for oral reading as a means of entertaining others.

F) Development of discriminative taste with regard to literary merits of reading matter.

Macmillan[1] gives a similar list of reading skills to those already mentioned. He divides reading skills into: 1) Reading to get the main idea of a passage. 2) Reading to answer specific questions. 3) Reading to follow logical sequence and development of ideas. 4) Reading to apply what is read. 5) Reading for deductions and implications. 6) Reading for evaluation.

Witty[2] supplies us with a more specified classification of the reading skills. He thinks the following reading process and skills should be emphasized in the middle grade: 1) Developing comprehension: A) Following direction and finding information. B) Finding answers to personal and social problems.

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1. 1965, p.11.
2. 1949, p.5.

C) Reading a story for various purposes. D) Understanding words. 2) Reading to remember: A) Remembering important ideas. B) Remembering significant details. 3) Associating ideas and materials: A) Finding proof. B) Finding information relevant to particular problems. C) Examining basic assumptions. D) Studying the adequacy of presentations. 4) Organizing ideas and materials: A) Arranging events in sequence and making outlines. B) Summarizing. 5) Increasing speed of silent reading. 6) Improving oral reading.

From all that is said about reading, its nature and skills, it may be concluded that reading is a many-sided activity. It is a broad term which means all things to all people. It may mean: the correct production of the sounds of the language; acquisition of a large vocabulary; the awareness of the structure of a language and of the way it develops and changes; a simple act of getting meaning from certain combinations of letters; a skilful, efficient activity that carries the reader along with the writer and identifies him with the writer's ideas and points of view; an aggressive approach to criticizing and evaluating the writer's thoughts; an act of checking the accuracy of an author's generalizations against his sound rationale to support them. Reading habits, then, may be defined as the act of acquiring the reading skills, or misusing those skills, by repetition, practice, and experience. And it is the habit-building that makes

the act of reading a long process that starts at the primary level and runs through all levels of the educational system. Learning to read never stops. It goes on as far as man desires to learn. Learning means reading; and since reading material becomes more difficult every day, man has to improve his ability to read proportionately.

Effective Reading and the Efficient Reader

E. Fry's definition of good reading is that "Efficient reading requires an active mind, not the mere passivity of saying the author's words."[1] Two things might have been implied here. Firstly, reading is not reading aloud, and secondly, comprehension is not only understanding the literal meaning of an author's words. It is also the ability to get the implied meaning a writer tries to convey. Reading comprehension in this sense is a type of communication between two people on two levels at one. Hence, Fry, again, describes it as possessing "the objective facts and subjective information."

Reading to Gardner, "involves no conscious effort and attention is directed not to sounding individual letters or words, but to the content and meaning of the printed text",[2] which is comprehension and the ability to interpret what has been read. Herrick believes that a skilful reader with good

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1. 1965, p.15.
2. 1965, p.5.

habits "is not limited to word-by-wprd reading; his eye moves swiftly over the page, absorbing the material in thought units, or meaningful phrases."[1] Harris adds that "to many an expert reader the meaning seems eventually to leap from the printed page with scarcely any awareness of inner speech."[2] He elaborates on this concept of reading by saying "Genuine reading situation, however, calls for much more than the ability to read words, phrases, and sentences. They involve many different kinds of higher-level skills, which vary according to reader's purpose and requirements set by the reading material."[3] Letton believes that "the effective reader reads a wide variety of material."[4] He enlarges upon this definition and says that the effective reader "is vocabulary conscious", and he becomes quite aware of the writer's technique in selecting his words to give precise meaning or to give a certain effect, such as those of poetry. This type of reading process certainly leads to the critical evaluation of ideas and thoughts.

Gray[5] reports Witty's definition of the characteristics of an efficient reader as follows: "He reads for a purpose; he has a wide meaning vocabulary; he reads in thought units; he evaluates what he reads; he reads widely and enjoys reading; he reads many types of material; he adjusts his speed of

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1. 1963, p.9.
2. Harris, A.J., 1961, p.9.
3. Ibid., p.433.
4. 1959, p.9.
5. 1954, p.11.

reading to the kind of material read." Gray adds his own definition of an efficient reader to that of Witty. He says that "the competent, or mature, reader exhibits the following attainments: He perceives words quickly, accurately and independently. He has acquired the understandings, attitudes, and skills involved in recognizing both meanings and pronunciation and is able to make efficient application of the skills as needed."[1] Accordingly, the clear meaning of what he reads at different levels with different material and at different occasions. Hence, reading is not only the recognition of the literal meaning of a passage, but also the grasping of the implied meanings. Often a reader is called upon by situations to make generalizations and reach conclusions from what he read; and he who could do it, to Gray, is a mature reader. To him, certainly, the grasp of the meaning and the organization of an author's idea is important, but not sufficient. He figures the mature reader as the one who brings his previous knowledge and experience into relation with his present reading, comparing the facts and arguments of different writers in order to point out the errors, if any, in the logical reasoning of any of the writers.

Leedy thinks that effective reading is that type of reading through which a reader gets what a writer is trying to convey in the shortest time possible. He says, "In short, effective reading is the result of acquisition of

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1. Gray, 1954, p.12.

a set of skills and habits - reaction patterns to the printed page- which makes 'reading' the page more rewarding and less laborious."[1] An efficient reader with good reading habits to him, then, is the one who reacts to a page of print in such a way that he gets the thought out of it fast, easily, and clearly. He thinks that the good reader asks questions, as he reads, about the author's main idea, his thoughts' organization, his pattern of presentation, and so on. In other words, the efficient reader identifies his thinking with that of the author's. But this is not enough. A good reader, he believes, can sometimes predict what the writer is going to say next "and be far ahead of him - out there, waiting for the author to catch up to him, the reader."[2]

A Brief Comparison of the Reading Situation Between Iraq and Britain and the U.S.A.

At this point it may be useful to refer to the reading situation in Iraq and in some technologically advanced countries, such as the U.S.A. and Britain.

Reading in Iraq was and still is little more than words recognition. The current system of teaching reading is reading aloud round the class; or at more advanced level, at secondary level, a student chooses a topic, reads it aloud, and the rest of the class listen, often lulled to sleep. The

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1. Leedy, P., 1956, p.2.
2. Ibid., p.13.

students think this is reading. The teachers, unfortunately, do not know that to sound out words is not reading. No attempt has ever been made in Iraq to teach children to get the thought from what they read. When they had learned to say the words correctly, their reading achievement was supposed to have been completed.

The reading situation throughout the primary school starts with the teacher making the students aware of the individual sounds and then putting them together to produce a word. This is a very short and simple process in a language with a phonetic alphabet like Arabic. Hence, the teaching of reading and learning to read is no problem at all at the early stages. But reading stops here. No attempt is made to read for meaning. No questions are put to them to check their comprehension after the reading is done.

Emphasis on the accuracy of reading at all times and at all levels, has built into the students the habit of vocalization; uttering each letter of each word, even if they are asked to read silently. The very little silent reading the secondary students do is without any guidance. They do little or no reading on their own initiative. Since reading does not convey any meaning to them, it is a bore. They get tired rapidly, throw the book down and give up. They cannot go on reading unless the printed symbols convey something to them. Hence they hate the whole business. They even read with

labour and sweat the material of their other subjects, such as history, geography, etc.

Reading aloud made the Iraqis slow readers. They have hardly any spare time to read for pleasure. They do not even have enough time to read what the teachers of different subjects ask them to. They are usually nervous, loaded with a sense of lack of achievement. Meaning is not their worry, because reading as taught to them consists of letters and words recognition and nothing else. Quantity, then, and not quality, is the cause of their anxiety. The questions the teachers of other subjects put to them do not demand more than the plain, literal sense of the written words. For example, if their geography text says "England is an island", the teacher asks, "What is England?". All that the students need to say is "an island". Thus they lack the experience in both extensive and intensive reading. They neither read widely nor read for implied meanings; because to understand and interpret the meanings of what they read is, perhaps, something they know nothing about.

There is hardly any reading preparation phase for Iraqi children at home. They are not ready for starting reading, when they begin school. The traditional type of reading method, followed in England a hundred years ago, is still exercised in teaching reading to the children in Iraq. The method is simply the alphabet spelling method in which the letters of the words are named

in sequence and then the word is pronounced. Stress, then, is placed on calling words; and nearly all the reading throughout school time is oral. As the Iraqi children get beyond the beginning stages in reading, and the task of recognizing words becomes automatic, reading instructions and teaching practically stop. Unfortunately, the definite need for continued guidance in reading is not yet recognized.

The English speaking child is well prepared at home to start reading at school. He is provided with a large supply of books with brightly coloured and interesting pictures that tell stories. He hears the stories and then reads them and makes associations between words and pictures. These books are written by specialists, and the stories are presented in such a way that the child finds a satisfying fulfilment of his unconscious wishes in them.

Numerous researches have been done in this field:

> "In the field of reading readiness and beginning reading there was further accumulation of evidence that development in the child of concepts preparatory to reading is highly advisable and that many different influences help to decide when a child is ready to begin reading." 1

Age, as it is in Iraq, is not the only criteria in the English speaking countries. The Iraqi child has scarcely ever seen such books written in his language. Even if a book of coloured pictures for children is published, there is hardly any educational purpose behind it.

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1. Traxler, A.E. & Townsend, A., 1955, p.4.

The first stage of reading English, which is the production of the sound system correctly, is the problem stage, because the spelling of English words does not always match the phonemics of the language. "Many studies of children's errors in reading have been made. Most of them have been made in America, and most of the investigations have taken place since 1923."[1] This problem is on its way to being solved by the application of the i.t.a. method of teaching children. Nevertheless, teaching of reading in the modern world encourages children to read words in meaningful context from the beginning. "In first grade material each line of print usually presents a sentence, or complete unit of thought. When sentences become too long to go on one line the authors are careful always to break the sentence at a division between phrases, and the fact that the two lines form a sentence is shown by indentation."[2]

The second stage of teaching reading covers the period during which the responses to the visual patterns become automatic habits. Silent reading in which speed of comprehension and level of comprehension is aimed at, is stressed advisedly. Reading stops to be a physical activity during this stage and becomes a mental activity. The teacher's interest is to help the students to get meaning from the page. "In most localities

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1. Daniels and Diack, 1956, p.38.

2. Harris, A.J., 1961, p.422.

nowadays the public library has a children's section which is well stocked with both fiction and non-fiction, and if there are any pupils who do not make use of it, they should be encouraged to do so."[1] Thus the teacher is the one to encourage. The school, too, helps by giving a weekly library hour for each form to enable the pupils to become familiar with what a local library has to offer them.

The third stage begins when the reading process itself is so automatic that the reading is used only for developing 'higher levels' of reading abilities; the meanings behind and beyond the printed page, and the critical evaluative type of reading. Hence it can be said that the English readers are trained to read well. Barbe says that "this last half-century stands out as a truly golden period in the progress of reading instruction".[2] And Yoakam explains Basal reading as "a systematic attempt to teach children to read by giving them daily instruction."[3] Fries confirms the assertion by saying: "The discussion in English concerning the methods and materials for the teaching of reading began at least four hundred years ago."[4] He reports the strong objection John Hart published, in the second half of the sixteenth century, to the 'alphabetic' method of teaching reading. H.W. Distad

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1. Whitehead, 1966, p.61.
2. Barbe, 1965, p.37.
3. 1955, p.1.
4. 1963, p.1.

reports that:

> "A number of studies have been made of the effectiveness of different reading procedures. Becuchamp, for example, showed that more thorough comprehension of large units of elementary science material was secured with directed study procedures than with undirected study of the same material." [1]

Moreover, courses of fast reading are given using either tachistoscopes or films such as those of the Harvard Project. The training is not only in speed, but in comprehension too. The questions put to the students on a passage read silently, always guide the students to look for meaning and meaning of deeper level. And every teacher in England and the U.S.A. is, to some extent, a teacher of reading. Through questioning his or her students in the subject field, the teacher trains them to think, when reading, and get meaning.

There is an outside as well as this innate pressure, the improvement of individual abilities, to read rapidly and with precision. The availability of books, books of all kinds of literature, and libraries is a strong outside factor in persuading and encouraging people to read. In 1963, there were 175,738,000 volumes of books in the United Kingdom libraries, excluding the schools libraries about which statistics were not available then.[2]

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1. J. Educ. Psychol., 1927, p. 247.

2. Unesco Statistical Yearbook, 1966, Unesco, 1968, pp.324-333.

Moreover thousands of books were published every year: "In 1966 British publishers issued 27,424 separate titles, of which 21,049 were new books..."[1] In 1964 there were 703,245,000 volumes in the United States libraries, including the school libraries.[2] Increase in number of publications is growing ever faster; even too fast to enable a research worker to obtain the latest statistical figures. In recent years publications of paper-backed books of all kinds has greatly increased.

Libraries have been increasing to meet the demand of the educational development. The number of libraries in the United Kingdom, excluding the school libraries, was 2,220 libraries in 1963. While in the United States of America there were 54,708 libraries in 1964.[3] This figure includes the school libraries. The English reader, then, cannot afford to be a bad or a slow reader. In order to catch up with the speed of growth in modern life he has to improve his reading abilities.

Different purposes lead different people to read different types of literature. Wish-fulfilment is one of the strongest factors that attracts young people to read. A girl of fifteen takes readily to the "Barretts of Wimpole Street", because she can easily impersonate the heroine and live the events

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1. Britain, An Official Handbook, Prepared by Central Office of Information, London, Her Majesty's Stationery Office, 1968, p.226.
2. Unesco, 1966, op. cit.
3. Ibid.

of the novel in her person. A boy of the same age finds hardly any difficulty in re-living "Robinson Crusoe's" life by reading the novel. Thus "the most popular books are invariably fiction. They contain plenty of fast-moving action and are marked by vivid dramatic presentation".[1] Unfortunately, reading material such as these are few in Arabic. The 2,062,000 books in the 3,712 Iraqi libraries,[2] are mostly old books. New books are relatively few.

Arabic literature, for years, consisted solely of poetry, of the Holy "Quran", some religious stories, and the "Arabian Nights", are excluded. Prose was introduced in the Arabic Literature in the middle of the nineteenth century, when the translation of foreign literature started in Egypt. The first translations were from French literature. The translation of English novels did not start until the twentieth century; some time between 1910 and 1930.[3] Hence, translation of world literary masterpieces was the basis on which Arabic short stories and novels were built and introduced in Arabic literature.

The movement which started in Egypt expanded to other Arab countries. The Lebanese, the Syrian, and the Palestinian writers are ranked among the famous writers of the world. Iraqi story and novel writing has started only

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1. Whitehead, 1966, p.44.
2. Unesco, 1966. Op. Cit. The writer wishes to make a comment on the Iraqi school libraries. They usually are not more than a shelf or two at the corner of the headmaster/mistress's office, where the student cannot reach.
3. Al-Khlili, Ja'afar, The Iraqi Story, Then and Now, Insaf Press, Beirut, 1957, p.136.

very recently; it started forty years ago in its simplest forms. The Iraqi story and novel writers are not very many; Al-Khalili mentioned only four short story writers and three novel writers.[1] The work of these writers could suffice as one day's reading material for a fast reader. The Arabic literary prose (short stories and novels) in general, is relatively few. An English average reader could, perhaps, read them in a year.[2]

The social customs of a nation has a lot to do with their reading habits. Generally speaking the English speaking countries have become bookish since the industrial revolution. The rapid technological advancement is putting more pressure on people to read. People have no time to get together and talk; they read instead. They read on the bus, on the train, besides their home fire in an easy chair, and even at their tea and lunch breaks. Reading to them "becomes part of enjoying the dying moments of the day".[3] Since it serves a purpose and it meets a need, it is in action all the time. The Iraqis are seekers of information too; but they are not all that busy not to afford time to talk and chat. Only a small section of the people are very busy; and these, perhaps, represent the reader class of the population. The lawyer reads to defend his client; the doctor reads to write a prescription; and the politician reads to deliver a speech. The rest

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1. Ibid., p.163.
2. The writer could, though with difficulty, collect the titles of 250 volumes of Arabic short stories and novels.
3. Gardner, 1965, p.9.

spend their time talking, listening to the radio, or watching the television, by means of which they get satisfaction, and their needs, thus, are met. Reading does not make much sense to them. It is an act of 'sweat and toil'. Why, then, read? From all that has been said, it is clear that the Iraqis lack the pressure to read; the innate, which is their ability, and the outside, pressure.

Yet there is another important aspect of reading and that is reading in a foreign language. What is, then, reading in a foreign language? "Reading in a foreign language consists of grasping meaning in that language through its written representation."[1] This definition does not actually add much to what has already been said about reading. It only emphasizes the language aspect and the graphic symbolization, representing it,more than the other aspects of reading. The language difficulties a foreign reader meets while reading are basically the same as those he encounters in understanding it aurally. The English child, when starting reading, does not face the difficulty of deciphering the language code. He does not face the difficulty of learning a new sound system, new words, or new grammatical structures. But an Iraqi learner of English has to learn the English language code at the same time as the reading skills. He has to master the language in order to learn to read fast and with precision.

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1. Lado, R., 1962, p.223.

To round off now this chapter in the light of the definitions and arguments developed so far, the following points may be made: 1) Reading is the grasp of the language code; its sound system, grammatical structures and word meanings. 2) Reading is a physical activity which is a primary skill for improving speed of reading and comprehension. 3) Reading is a mental activity and a thought-getting one. 4) Reading is all these skills combined to form "one aspect of general ability which underlies all human behaviour, that is, ability to communicate."[1]

Although the aim of this work is the evaluation of the reading abilities and habits of advanced learners of language (English and Arabic), the language factor has to be controlled. The reading material is to be within the range of the readers' experience, both linguistically and perceptually. Thus the approach to this problem can conveniently be based on two sources. The definition of the nature of reading, which is done in the present chapter, and the study of the work done in this field by eminent scholars. The next chapter will, then, consist of a brief survey of the researches and studies done on reading in order to utilize the distinctions and similarities of ideas to help the development of the present study.

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1. Lee, T., 1965-66, p.12.

CHAPTER II

A REVIEW OF PREVIOUS RESEARCHES, RELATED STUDIES AND TESTS

> "Research in the field of reading is more voluminous than that for any other area of the school curriculum."[1]
>
> "The number of studies of various aspects of learning and teaching reading published during this century runs well into five figures."[2]

It is neither feasible nor necessary to review, either in detail or in brief, all the huge amount of research and experimental studies which have been carried out in the field of reading since 1879[3] in Europe, and 1891[4] in the United States of America. Summaries and bibliographies of researches done in the field of reading since 1930 are available in the "Educational Records Bulletin" Nos. 32, 46, 64,[5] and 75.[6] In the first three volumes 1,905 studies are reported (618 in the first, 527 in the second, and 760 in the third), and a total of over four hundred titles is briefly explained in the last Bulletin.

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1. Traxler, A.E., in Jewett, A., 1957, p.5.
2. Daniels & Diack, 1956. Introduction.
3. West, M., 1926, p.139.
4. Smith, N.B., in Robinson, H.A., 1966, p.3.
5. Traxler, A.E., & Townsend, A., 1955.
6. Traxler, A.E., & Jungeblut, A., 1960.

As it is a generally accepted fact that reading is "a complex system of skills", research has been concerned with "reading readiness and beginning reading", with "reading interests", "reading in connection with other school subjects", "vocabulary and content of elementary school readers", "vocabulary lists and vocabulary building", "phonics", "reading tests and test procedures", "speed of reading", "eye movements and reading ability", "reading achievements and psychological factors", "reading achievement and sociological factors", "diagnosis of reading difficulties", "remedial and corrective teaching of reading", and many, many other aspects.

N. B. Smith[1] divides the phase of reading progress in the United States of America into four periods: 1) From 1891 - 1910; 2) 1910 - 1925; 3) 1925 - 1935; 4) 1935 - 1950. The first period is described as "the budding" of research which flowered in the second period, the most stimulating and active one. It marked the birth of scientific research in education. Thorndike's scale for the advancement of science was the starting point. Many studies, such as that of W. Gray, followed later. The third period was merely an extension and application of what had already been done. In the last period, which was disturbed by the Second World War, the decrease in the research output was obvious, but valuable studies have continued right to the present time in the field of reading.

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1. In: Robinson, H.A., 1966, pp.3 - 10.

One incentive to research has been remedial - to determine the causes of inefficient reading and reactions to the methods of teaching reading. Since this investigation is not concerned with the causes and the consequences of Iraqi students' reading deficiencies, remedial work is not directly relevant, but much of it is useful.

The most pertinent studies for the present investigation are those which are analytical and throw light on the skills of silent reading. Of these it has been said:

> "The two aspects of reading which have received the most attention are speed and comprehension. Various tests have been devised to test either the speed or the comprehension."[1]

Silent Reading

Generally speaking, research in the field of reading tends to handle in some detail the primary stages which deal with word perception and the comprehension of the obvious, the literal meaning. This is so not only because this period seems to be of crucial importance in the building of the foundation for later reading skills, but also because it is, apparently, the area which causes particular problems in learning and teaching the reading of English. These seem to have arisen from the English spelling system, which does not give an efficient guide to the sounds of English words. Therefore

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1. Tinker, M.A., 1939, p.81.

deficiency in both word perception and word recognition could be due to sound-spelling differences. This could be very true for the foreign learners of English, especially those foreigners whose writing symbols represent their sounds more consistently. Numerous inquiries and researches have been reported in this field. Reformed spelling started with John Hart,[1] 1551 - 1596, and ended with Sir James Pittman's i.t.a., the "Initial Teaching Alphabet". The i.t.a. consists of 43 letters each of which matches a phoneme. It was used experimentally to teach reading by the London Institute of Education. John Downing[2] reports the first three experiments with the i.t.a. and the data collected, though limited, provided a good basis for continuing the experiment. The latest report in the Guardian[3] suggests that the i.t.a. is a sound method of teaching reading to English children. It might prove even more sound for teaching reading to foreign adult learners who possess a phonetic language. However, both the English children and the foreign adult learners are beginners. Since it talks about the sounds of letters and words, the discussion appears to be more related to reading aloud than to silent reading. But since the speed of silent reading and the perception of word meaning depend to a great extent on the recognition of

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1. Fries, C.C., 1963, p.9.
2. 1964.
3. The English newspaper, see Chapter I.

sound-spelling relationships, the argument is relevant.

In spite of the vast research in the area of beginning reading, relatively little work has been devoted to the secondary or the university stages of reading that deal with reaction and integration, perhaps more significant factors in the reading process.[1] A considerable amount of this work found relevant to the purpose of this review deals mainly with reading comprehension or speed. Tinker[2] has made it clear, however, that "there are many reading skills rather than either a general silent reading ability, a general comprehension ability, or a general speed of reading ability."

As has already been pointed out, this chapter does not intend to present a complete summary of the research relating to the comprehension or the speed of reading. A representative sample of studies in each area will be discussed as a means of sketching the general impression of reading conveyed by research.

A large proportion of the studies in the advanced silent reading area appears to be connected with reading speed in general, and some of its aspects in particular, i.e. eye-movement, eye-span, number of eye-fixations per line, vocalization and so on. The great attention paid to the speed of

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1. Massey, W.J., & Moore, V.D., 1965. Preface.
2. School and Society, Vol. XXXVI, 1932, pp. 158-160.

reading at this advanced stage is understandable.

Speed

If the march of progress in the area of reading speed is to be traced, it is necessary to go back to October 1894 when Adelaide Abell's article, "Rapid Reading: Advantage and Methods" was published in lthe Educational Review. Miss Abell's data, which was based on undergraduate students, give evidence that "reading deficiencies appeared among college students".[1] European psychologists preceded Miss Abell in this field. The early experiments, started by Cattell, Erman, and Javal, go back to the "middle 1800's".[2] Hence it is quite clear that investigations in the area of college students' reading, though relatively few, are not of recent origin. The number of researches which connect the early investigations with the effort of recent works might come to hundreds or even more. G.T. Buswell[3] gives 1930 as the starting point of the extension of the adult-education movement in the United States, and since then without doubt this tendency has been accelerated. Though they all treat speed as a main factor, they differ considerably in nature.

Some studies, such as that of Tinker, are interested in the relationship between rate of reading and comprehension. Tinker[4] illustrates that the

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1. Hill, W., in: Cousey, O.S., 1960, p.9.
2. Ibid.
3. Supplementary Educational Monographs, No.45, 1937.
4. In: J. Educ. Psychol., Vol. XXX, 1939, pp.81-94.

correlation between rate of work and comprehension is very high when the reading material is easy; but when the difficulty of the reading material increases, the correlation decreases at a regular pace. Tinker[1] again reports a significant relationship between rate of work and comprehension; but at the same time points out that the relationship was affected by the nature of the reading test, the purpose for which the reading was done, and the techniques of measuring the difficulty of reading material. The result of Carlson's[2] study indicates that at a higher level of intelligence, the faster readers comprehend better, while at the middle and lower levels of intelligence, the slower readers tend to have a very good comprehension. The correlations between the rate of reading and comprehension in Shore's and Husband's[3] study were either low or negative. Accordingly, their conclusion is that the fast readers are not necessarily the best readers. Anderson and Tinker[4] arrived at a conclusion which clarifies the kind of relationship that exists between speed of reading and comprehension. They state that there is an intimate relationship between rate of reading and comprehension only when the same material or strictly comparable material is used. The following quotation sums up the results of the studies:

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1. In: J. Educ. Psychol., Vol.XXVI, 1945, pp.217-228.
2. Ibid., Vol.XLII, 1949, pp.500-513.
3. Elementary English, XXVII, 1950, pp. 52-57.
4. J. Educ. Psychol., Vol.XXVII, 1936, pp.621-624.

> "The relationship between reading rate and comprehension has been extensively studied with widely varying results (correlation coefficients ranging from —— .47 to .92 have been reported.)" [1]

Other inquiries show interest in the ways, methods and possibilities of improving speed of reading. Some of the early studies tried to improve rate of reading without using any mechanical devices.[2] But the bulk of the work done in this area of reading speed is carried out by means of special films and machines preceded or followed by instructions. The pattern of J. B. Barclay's[3] course to improve speed of reading with improving comprehension, if possible, followed two principles: 1) Giving instructions to encourage the students to eliminate regression and vocalization; 2) using Harvard University films to train the students to read faster without loss of comprehension. The result of the course showed that in the absence of articulation, whether vocal or mental, the speed increased greatly. Harry McLaughlin[4] had experimented with the "Craig Reader" and found that although it was possible to increase rate of reading greatly, there seemed to be a limit to the amount of material that the human mind could retain. Nevertheless, the experimental subjects doubled their speed by the end of the course with 100% comprehension. Another experiment to increase the

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1. Blommers and Lindquist, 1944, p.449.
2. a) Henry, L. K., and Lauer, 1939; b) Lauer, A. R., 1948. In: Traxler and Townsend, 1955, pp. 157-158.
3. University of Edinburgh Gazette, 1957, pp. 23-30.
4. 1964, pp. 35-37.

rate of reading by means of using the "Craig Reader" was undertaken by Duncan and Foster.[1] They concluded that the "Craig Course" seemed to increase reading speed while maintaining a "constant" level of comprehension. The subjects of this experiment also doubled their speed of reading. The conclusion drawn from these experiments is perhaps that one can increase one's reading speed to a certain extent without decline in comprehension, if the comprehension is measured by questions that refresh one's memory. It seems that without an aided recall, the faster one reads, the less one retains from what one comprehends.

Another tendency of research is to find out the factors involved in, and affecting, reading speed. J.B. Stroud[2] shows, by pointing out the existence of a positive relation between rate of reading and rate of visual perception, that rate of visual perception is a factor in rate of reading. The study of J. Sutherland[3] reveals the relationship between perceptual span and rate of reading which is an obvious indication that span of perception is another factor in speed of reading. Tinker[4] points out that fixational pauses vary with difficulty of the reading material. Hence, the more difficult the material is, the longer the fixational pause and the slower is

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1. J. Educ. Psychol., 1966, pp.327-330.
2. J. Educ. Psychol., 1945, pp.486-498.
3. J. Educ. Psychol., 1946, pp.373-370.
4. J. Educ. Psychol., 1947, pp. 1 - 10.

the reading. This forcefully suggests that the fixational pause is a third factor in rate of reading. The fourth factor, which was mentioned in previous paragraphs, is vocalization.

The importance of the perceptual factor in speed of reading was confirmed by C.M. Freeburne. His study,[1] which aimed at predicting reading improvement from perceptual data, yields similar findings to that of Sutherland.[2] But Strang[3] states that the "psychophysiological" limit of time for comprehension cannot exceed 500 - 800 w.p.m. Beyond this rate comprehension might suffer. Taylor[4] who agrees with Strang that there is a limit to the eye span, limits this span to 2.5 words for the most superior readers. M.D. Vernon[5] illustrates the variation of eye movement among individuals with the change of material and purpose of reading. Like Yaokam, she classifies reading speeds into categories: 1) ordinary rapid reading; 2) scanning; 3) careful reading; 4) detailed studying; 5) summarizing; 6) paragraphing; 7) analysing for style; and 8) proof-reading. However, it was shown that all the different levels of speed had been improved by developing the reading motor and perceptual process in

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1. 1949, pp.321-332.
2. Op. cit.
3. Quoted in Macmillan, 1965, p.5.
4. Ibid., p.5.
5. 1931.

mature adults. It was also pointed out that efficient motor habits could be developed in the reading of foreign languages, i.e. English readers reading foreign languages. L.G. Stone, who carried out a study of the eye-movements of college students while reading different material, found that there were significant differences of eye-movements between the selections.[1] The nature of eye-movement was studied and identified by Tinker[2] as a result of reviewing 188[3] studies and reports related to eye-movement in reading. The earliest checking upon eye-movement started by using mirrors and the photographic machines. These machines became later very complicated and accurate.

Although experiments in Commonwealth Africa show the need for improving foreign students' ability of reading, very little work has been done up to 1965 to investigate the particular problems of training foreign learners of English to read rapidly and efficiently.[4]

Before proceeding to comprehension, the second major aspect of reading, a brief reference to the experiments concerned with reading habits and interest must be given. More than 800 studies of American reading interests and habits have been reported during 1900 - 1930.[5] Gray and

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1. J. Experimental Educ., Vol. 10, 1941, pp. 64-70.
2. Quoted in Gray, W., Review of Educational Research, Vol.X, 1940, p.83.
3. Gray, W., ibid.
4. Macmillan, M., 1965, p.18.
5. Gray, W., and Munroe, R., 1930, p.4.

Munroe's own report[1] is one of the outstanding works in this respect. They tried to secure information about the reading habits and interests of, and material read by, American adults and the influences that determine their development. They report that those who have interest in reading and have developed a habit of reading are those who have been subjected most frequently to the influences which normally develop reading habits such as good schooling, bookish families and friends, library facilities, and so on. Many other studies published in the four "Educational Records Bulletin"[2] cover the same ground and report more or less the same findings. Notwithstanding the huge amount of work issued on the reading interests and habits of American citizens, hardly any has been reported in which an effort was made to survey the habits and interests of foreign readers of English. The reading habits and interests are discussed under the heading of speed because the majority of reading habits are related to the factors involved in the rate of reading. As these have already been mentioned, repetition is duly avoided.

Comprehension

Countless experiments and studies have been reported with respect to the skills and factors involved in reading comprehension. The survey and

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1. Ibid.
2. Traxler, A. E., and Others, Nos. 32, 46, 64, and 75.

discussion of studies will include only those investigations which are closely related to the purpose of the present work.

During recent years continued interest has been exhibited in the factors and skills involved in reading comprehension. The question has been whether comprehension is a globular ability or not. Does comprehension consist of one skill, many interwoven skills or many clearly separated skills? To answer this question many inquiries and studies have been carried out. Some arrived at their conclusions, and named the skills that comprise reading comprehension, subjectively, and some others discovered the reading comprehension skills through systematic and scientific procedures such as factor analysis. "Factor analysis has been widely accepted as a means of exploring uncharted domains where basic and fruitful concepts are essentially lacking."[1]

One of the earliest studies, carried out by M. Pankaskie, 1940,[2] revealed three factors, identified as speed of comprehension, vocaublary, and ability to find answers to questions. The sub-tests of the Iowa silent reading test, which was one of the Iowa Tests used, did not show "pure" measurement of these factors. This could mean that other factors could, perhaps, be abstracted from the sub-tests. R. S. Langsam, who carried out a most thorough study of eight well-known tests, discovered five factors,

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1. Hall, W.E., J. Educ. Psychol., 1945, p.441.
2. Quoted in: Hall, W.E., ibid., p. 430.

namely, verbal, perceptual, word, number and relationship.[1] One of the pioneer studies in factorizing reading comprehension into its major components was undertaken by F. B. Davis in 1942 to obtain levels of comprehension.[2] In 1942[3] he applied factor analysis to the nine skills of reading comprehension which were singled out as a result of a careful survey of the literature in the field. The most striking aspect of this study is that the nine comprehension skills were "moderately pure factor measures". The nine basic comprehension skills determined objectively yielded nine independent components by application of factor analysis. The skills are: 1) Knowledge of word meanings. 2) Ability to select the appropriate meaning for a word or phrase in the light of its particular contextual setting. 3) Ability to follow the organization of a passage and to identify antecedents and references in it. 4) Ability to select the main thought of a passage. 5) Ability to answer questions that are specially answered in a passage. 6) Ability to answer questions that are answered in a passage but not in the words in which the question is asked. 7) Ability to draw inferences from a passage about its contents. 8) Ability to recognize the literary devices used in a passage and to determine its tone and mood. 9) Ability to determine a writer's purpose, intent, and point of view, i.e. to

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1. Ibid.
2. J. Educ. Psychol., 1942, pp.365-372.
3. Psychometrika, Vol. 9, No.3, 1944, pp.185-195.

draw inferences about a writer. These findings are of great help to measure the relative importance of comprehension skills, detect their causes, and apply remedies. Perhaps they are a step forward in solving an acute problem described by A. I. Gates:[1] "Reading comprises of highly complex abilities that are not easily detected". It seems that P.E. Vernon[2] agrees that although comprehension, like general ability, depends on a strong general factor, yet something depends on some other specific factors. This interpretation of Vernon's intended meaning may be supported by his saying: "There is fairly strong evidence for partially distinct speed of reading, vocabulary or word knowledge and comprehension of sentences and paragraphs, factors at the high school and college level, though at the same time there is a strong general factor."[3] Even by applying Thurstone's idea of a single common factor plus a small residual, one can easily conclude that the special factors may be extracted from the residuals, no matter how small they are.

Other studies, apart from factor analysis, pertinent to reading comprehension skills are reported with the aim of improving reading abilities. W, Gray[4] discovered a list of factors that cause difficulty or failure in interpreting what is read as a result of his thorough study of four cases. They are: 1) lack of training in intelligent interpretation; 2) failure to direct

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1. The Improvement of Reading, 1935, p. 4.
2. 1950, pp. 27-28.
3. Ibid., p.44.
4. 1929.

attention to the content while reading; 3) inadequate or ineffective habits of thinking; 4) a narrow range of experience concerning the things referred to; 5) inadequate reading experience in the field concerned; 6) immature language habits which resulted in failure to grasp the meaning of many commonly used forms of expression; and 7) an over-cultivated imagination which resulted in reading into passages things which were not there. W. Gray[1] also surveys briefly some of the works that display the effect of some factors on reading achievement. Nolte's[2] work shows that factors such as meaning vocabulary, the inherent difficulty of the concepts, and the relation of the pupils' experiences to the ideas presented, influence comprehension. Pickford's[3] study adds another factor, i.e. style of presentation. He concludes that some obscure styles make clear ideas difficult to understand, while some clear, simple styles turn complicated ideas to easy, understandable thoughts. Changes in the difficulty of material as a factor that affects achievement in comprehension was pointed out by Walker and Tinker.[4] Flanagan demonstrated that modification in speed of reading affects level of comprehension.[5] E. L. Black[6] found on classifying the errors of training college students in comprehending prose that there were eight types

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1. Review of Educational Research, Vol.X, No.2, 1940, pp.79-106.
2,3. Ibid., p.98.
4. W. Gray, ibid.
5. Ibid., pp. 98-99.
6. Brit. J. Educ. Psychol., Vol.XXIV, 1954, pp.17, 31.

of errors. Though his findings are based on his personal subjective judgement of the students he taught, he provides good argument in supporting his following findings: 1) Vocabulary is an important factor in comprehension; 2) even the comprehension of straightforward ideas causes difficulty; 3) to discover an author's intention is a problem; 4) to detect irony causes a big problem.

The studies reported about factors affecting reading comprehension lead researchers to work in the field of remedial work. Rogers[1] discovered that the college's poor readers were below its good readers in reading accuracy. R.W. Kilby,[2] who carried out an experiment to find out the relation of a remedial reading programme to the improvement of scholastic standing, discovered, amongst many other things, that the college students who received remedial instructions in reading gained a significantly higher grade average than did those students who did not receive any remedial reading instructions although both groups were of equal predicted grade status. E.L. Black[3] found that college students vary greatly in their reading ability. He accordingly suggested that the poor readers need particular instruction and training in effective reading. He adds that training to read efficiently helps even the best readers, since there is always something to learn about reading.

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1. J. Educ. Psychol., 1945, pp.513-534.
2. Quoted in: Gray, W., 1940, p. 98.
3. Times Educ. Sup., December 21st, 1951, p.982.

The"Harvard Reading Course" is one of the well-known courses devised for improving reading abilities. J. Duncan[1] states that the questions put on the reading material of the Harvard Reading Course do not require a mere recall of the subject matter, but it demands also thinking about it, since some of the questions demand the selection of one answer, the most relevant, from among four given answers. Moreover, some of the questions require answers of an inferential nature. Though many authorities put the blame for failure in providing inferential answers on intelligence, Traxler reports that many studies showed that very many students read below their mental ability.[2]

Another well-known course for improving reading ability is the Reading Laboratory.[3] It was designed in an attempt to develop the most exact reading, thinking and vocabulary. It is a power builder method plus a rate builder course. It provides: 1) A sufficient number of reading passages in a wide range of subject-matter and reading skill levels to meet the individual differences in any class room. 2) Passages that are ranked according to difficulty from "easy" to "hard", taking into account the existing knowledge of the basic skills of reading. 3) Self-correction keys and Progress Charts which register a continual evaluation of individual reading progress. 4) Multi-level learning material which constitutes a unified and individualized programme that

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1. 1953, p.34.
2. Traxler, A.E., in Jewett, A. (ed), 1957 , p. 6.
3. Parker, D.H., Science Research Associates, Inc., U.S.A., 1958. This course was seen by the writer at the School of Applied linguistics, Edinburgh University.

can be presented throughout the grades. The course seems to be of great help in achieving mastery of the levels and skills of reading. The reading passages are usually followed by questions or items such as:

1) Did you see the writer's purpose?

The main purpose of the writer is to:

A) Amuse the reader.

B) Explain what is meant by civilization.

C) Explain why tribes were formed.

This sort of answer trains the students to think deeply. Their qualitative thinking as a result of trying to select the best alternative is improved.

2) Often a word has more than one meaning, depending on how it is used. Choose the meaning of each word in bold face type as it is used in the story. Write its letters.

3) Idioms matching.

4) Synonyms matching.

5) What did the writer say?

6) What are the important facts?

7) Did you get the point? What is it?

8) What do you think?

9) Items with completion technique, and so on.

The course seems very good.

Numerous experiments, as already stated, have dealt with reading skills in general, and reading comprehension in particular, but so far as the writer of the present work could discover only one study that concerns the ability of foreigners to read English exists. This study was carried out by Michael West[1] for Bengali speaking intermediate students. Tests were devised and selected. The questions of the tests required answers directly found in the text. The results show that the Bengali intermediate students' reading ability was equivalent to the reading ability of Anglo-Indian students aged 9 - 13. As the aim of the investigation "was to determine by what means and to what extent the English reading ability of Bengali Intermediate students could be improved",[2] striking results were obtained: 1) The lack of ability in reading English was not a defect in only reading English, but it was rather a general reading disability displayed by Bengali students; 2) The students' reading ability in English was improved after practice; and the most interesting result was 3) The students' reading ability in Bengali was improved as the result of improving their ability in reading English.[3]

Tests

The definitions of reading by authorities in the field, quoted and discussed in Chapter I, are the outcome of research. At the same time, the

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1. 1926. Some also have been seen in Africa.
2. West, M., 1926, p. 7.
3. Ibid., pp. 6- 8.

investigations referred to in the previous pages could only be carried out through special means or tools. These means are known as tests. In order to complete the survey of the work in the field of reading, a survey of some well-known tests must be presented here. This survey, without doubt, will serve as a rich fund for the construction of the tests in the present work.

Tests of reading abilities and skills must have, as the teaching of reading had, a long history through which it developed and progressed. Most probably, they started at the same time, since no evaluation of teaching can be made without testing. Frequently, testing precedes the act of teaching in order to find out and determine what to teach.

Reading tests, in the same way as the process of teaching reading, were concerned at the beginning with the elementary stages. They naturally started with evaluating children's reading. Gradually, tests of reading grew at the same rate as studies carried out in the field of reading. A quick look at O. K. Buros' "Mental Measurement Yearbooks" may give an idea of the countless tests devised for evaluating reading. The description and discussion of all available tests seems quite unnecessary here. Samples of tests are to be discussed in the way that is thought to be most useful for the purpose of this study.

A close study of many tests available shows that different tests measure somewhat different combinations of the many aspects which comprise the act

of reading. Some measure the progress which has been made in word recognition or the knowledge of word meaning, some measure the grasping of the plain meaning of a text, and some others measure the comprehension of deeper and the more subtle meanings of a printed page and the speed of comprehending them, i.e. each of the skills separately. Nevertheless, all types of progress in reading can be measured through tests; tests of comprehension, in which vocabulary is included, and tests of speed, for all ages and grades and at different levels. Notwithstanding, "An examination of the existing tests, however, discloses little agreement among authors as to what constitutes an adequate measure of either speed or comprehension."[1] An effort, therefore, is made here to separate tests of speed from tests of comprehension whenever possible. Since some tests measure, at the same time, both rate of comprehension and power of comprehension, they are to be included in the survey of tests of comprehension to avoid a third category.

Silent reading tests can also be classified as regards the level they are intended for and as regards the function they are devised to measure. The second method appears to be the most useful, since it includes survey tests, analytical tests, and tests of single functions for all grades. As the aim of the present section of this chapter is to give a summary of the tests that might serve as a guide to the development of this work in general and the

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1. Tinker, M.A., 1932, p.158.

construction of its tests in particular, the survey of the tests is to be carried out under the following headings: 1) The Survey Tests; 2) The Analytical Tests; and 3) Tests of Single Function.

Before proceeding to survey the three main types of tests, some points must be made clear. First, although survey tests differ in a way from analytical tests, they both include comprehension tests which usually comprise tests of vocabulary, especially at advanced levels where words acquire their meaning in a context. At elementary levels, vocabulary tests, consisting of lists of single words, come under tests of single function. On the contrary, speed tests are included in tests of comprehension at primary grades, and under tests of single function at high school levels, where speed of comprehension means one thing and power of comprehension another thing. However, both tests of comprehension and tests of speed are included in the survey tests as well as the analytical test, yet with a different purpose.

Secondly, vocabulary tests are to be excluded from the discussion in the present survey, since vocabulary tests for elementary grades mean, as already has been pointed out, tests of words recognition, and for upper grades mean comprehension of the meaning of words in a context. In this sense, vocabulary, as many investigations have already shown, is an inseparable factor in reading comprehension. As the prime aim of the present work is

to keep the tests pure, this factor - vocabulary - is to be held constant.

Thirdly, the full form of all the tests surveyed here could not be obtained, since many of them are out of print. Hence, the description of some was provided by books such as those of P. Witty[1] and A.J. Harris,[2] while the full form of some others were kindly lent to the writer by Dr. W.H. King.[3] Thus the writer had the opportunity to study them thoroughly. Reference to these tests will be made later in the form of footnotes.

Fourthly, tests of comprehension usually consist of passages for reading followed by questions to be answered. The length and the kind of the passages and the type of the questions on them depend on whether the test is a survey test or an analytical test. The passages in a survey test are short, while in an analytical test they are long and need not be of different difficulty.

Survey Tests

Survey tests mean tests that measure fairly accurately the level of difficulty at which readers (usually children) can read. Often they have long time limits. Hence, it is the increasing difficulty of the test items, rather than shortage of time, that stops the pupils at some point or another.

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1. 1949.
2. 1961.
3. Institute of Education, University of London.

Some of the pioneer, best known survey tests in Britain and in the United States of America are: C.B. Burt's "Mental and Scholastic Tests",[1] P.B. Ballard's "Mental Tests and The New Examiner",[2] and "The Holborn Reading Scale"[3] in Britain. Gray's "Standardized Oral Reading Paragraphs",[4] M.A. Burgess' "The Measurement of Silent Reading",[5] and Gates' "Primary Reading Test"[6] in the U.S.A.

Burt and Ballard's tests are both concerned with oral reading. Ballard's test is a one-minute scale of graded words for children, while Burt's scale of reading combines both the ability to recall words and, at the same time, get their meaning fairly quickly when they are put together. The Holborn Reading Scale tried to combine the merits of both Burt and Ballard's scales into one. It consists of thirty-three sentences arranged in order of difficulty according to both their mechanical elements and their comprehensibility. Gray's standardized Oral Reading for grades one to eight consists of measurement of rate and accuracy of oral reading. Mrs. Burgess's Measurement of Silent Reading had, being probably the first of its kind, a special

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1. 1921.
2. 1920 and 1923.
3. 1944.
4. 1915.
5. 1921, in Gates, 1921.
6. 1942.

merit, as it was accompanied by a monograph that contained detailed explanations of the purpose and the application of the test. Gates' Primary Reading Test is divided into three sections, words recognition, sentence reading and paragraph reading designed for grades one to two. The time limits for these sections were 15, 15 and 20 minutes respectively. Thus the rate and the comprehension are measured in the same test. This usually happens in survey tests.

Other well-known survey tests are: The Stanford Reading Test,[1] which has been widely used, is a representative example of survey tests in reading for the primary to the advanced levels. Each level consists of two parts; one measures words meaning and the other measures paragraph meaning. In the vocabulary test each word is followed by a few others among which there is only one appropriate synonym to the original word. The series of short paragraphs which comprise the paragraph test, have missing words. The comprehension of these paragraphs requires the selection of the correct words and inserting them in the blank spaces in each paragraph. The time limits are 25, 30, and 30 minutes for grades 2 to 3, 4 to 6, and 7 to 9 respectively. Each of these tests has five forms.

Although the Traxler Silent Reading Test[2] for grades 7 to 10 includes measures of rate accuracy, vocabulary, and paragraph comprehension, it is

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1. 1940, in: Witty, P., 1949, p.219.

2. 1942, ibid.

primarily intended as a survey test.[1] The test has four divisions: reading rate, story comprehension, word meaning, and paragraph comprehension. The time limit is 50 minutes approximately. Four forms are available for the test, and they are adapted to machine scoring.

The Metropolitan Achievement Test[2] is another example of survey tests. The test is divided into three sub-tests known as Primary I, Primary II, and Elementary reading test. Primary I consists of measurement of: 1) Word pictures, 2) Word recognition, 3) Word meaning, 4) Numbers. The approximate time limit is 45 minutes. Primary II measures: 1) Reading, 2) Word-meaning, 3) Arithmetic fundamentals, 4) Arithmetic problems, 5) Spelling. The time limit is 85 minutes approximately. The Elementary Reading test, as well as the Intermediate Reading Test and the Advanced Reading Test, measure reading and vocabulary only. Each of them has a time limit of 35 minutes. Each of the sub-tests has 4, 4, 3, 3, and 3 forms respectively.

Most of the survey tests that are intended for upper grades follow a similar pattern with slight differences in the type of questions devised to measure paragraph comprehension. The Nelson-Denny Reading Test,[3] which is for the College and Senior High Schools, is generally of the same nature.

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1. Harris, A.J., 1961, p. 172.
2. 1946. In: Witty, P., 1949, p.217.
3. 1929 and 1960. The full form of this test was obtained.

This test consists of three parts: vocabulary, comprehension and rate. In the comprehension and rate parts of the tests there are eight reading selections, each followed by 4, except the first which is followed by 8, multiple choice items. Some of the items demand inferences. Special answer sheets and hand and machine scoring instructions are provided. Time is limited for both speed of comprehension and power of comprehension. There are two comparable forms of the revised test; each containing 100 items to measure vocabulary and 36 items to measure comprehension. The normal time is 30 minutes, 10 for vocabulary and 20 for comprehension, plus whatever time is needed to distribute and collect the test material and give the directions. It has a self-marking answer sheet with carbon marking device which eliminates the need for a separate scoring key, and an answer card for machine scoring.

Analytical Tests

The analytical test's purpose, in contrast to that of the survey test, is to provide a more detailed analysis of silent reading in order to be able to measure hypothetical skills involved in both rate of silent reading and comprehension. The statistical analysis of the results of the test will determine whether to accept or reject the hypothetical skills. Diagnostic tests are usually included in this type of test.

The Van Wagenen and Dvorak Diagnostic Examination of Silent Reading Abilities[1] has three levels known as Intermediate Division, Junior Division, and Senior Division. The Intermediate Division is devised for grades 4 to 5. It consists of measurement of: 1) Rate of comprehension; 2) Perception of relations; 3) Vocabulary in context; 4) Vocabulary as isolated words; and 5) General information. The time limit for rate of comprehension is 5 minutes, and no time limits are given for tests 2 to 4. The time suggested for the last four tests is 45 minutes. The Junior Division measures the ability to grasp the central thought of a text of grades 6 to 9. The Senior Division, which is intended for grades 10 to 12, is a test of interpretation, integration of dispersed ideas, and ability to draw inferences. For the last two levels of the test no time limit is given, but a period of 60 to 90 minutes is suggested. Two editions of the test are provided; a hand-scored edition, and a machine-scored edition.

The Chicago Reading Tests[2] have levels for grades 1 to 2, 2 to 4, 4 to 6, and 6 to 8. They are called type A, B, C, and D. Type A consists of five sub-tests: Comprehension of words, comprehension of phrases, comprehension of sentences; comprehension of directions, and comprehension of paragraphs. Type B measures comprehension of words, sentences, story,

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1. 1940. In: Witty, P., 1949, p.219.

2. 1940-1944. In:Witty, P., 1949, p.216, and Harris, A. J., 1961, p.175.

direction, and paragraphs. In addition, it measures rate of reading. The same skills together with interpretation of maps and graphs are measured by Types C and D, which are devised for the two upper levels. Each of these types has three forms, and the upper level forms provide machine-scored editions.

Gates' Basic Reading Tests[1] are intended for grades 3 to 8 to measure rate and accuracy in four types of reading:

A) Reading to appreciate general significance. The time limit is 6 minutes for grades 3 to 4, and 8 minutes for grades 5 to 8.

B) Reading to predict the outcome of given events. Time limit is 10 minutes for grades 3 to 4, and 8 minutes for grades 5 to 8.

C) Reading to understand precise directions. The required time is 10 minutes for grades 3 to 4, and 8 minutes for grades 5 to 8.

D) Reading to note details. Time limit of 10 minutes for grades 3 to 4, and 8 minutes for grades 5 to 8 are required.

Each of these types has four forms. Since the time limits are short, speed is made an important factor in these tests. Since all the paragraphs are of the same level of difficulty, they are not intended to measure level of comprehension, but rather certain skills of comprehension.

The Iowa Tests of Educational Development[2] consist of a battery of nine

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1. 1942, ibid.
2. Lindquist, E.F., 1959 edition. The full form of the test was obtained.

objective tests. They are designed to provide a comprehensive and dependable description of the general educational development of the high school students. Tests 3, 6 and 7 measure the ability to interpret Literary Material; Test 5 measures the ability to interpret materials in the social studies, and Tests 6 to 7 measure the ability to interpret Scientific and Literary Material respectively. Being a long test it has to be administered during many successive days. Special answer sheets are provided as well as Hand and Machine scoring schemes. Plenty of time is given. The following tables supply a short cut description of the tests.

Test	No. of Items	Working Time Mins.
1	90	55
2	90	60
3	103	60
4	53	65
5	81	60
6	81	60
7	80	50
8	75	22
9	65	27

The Comprehension Test for Training College Students[1] consists of a series of extracts each of which is followed by questions. To most of the

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1. Black, E. L., 1962. The full form of the test was obtained.

questions, the student is given five answers from which he must choose the best one. Several of the suggested answers may be correct - the student must make an effort to select the one answer that seems to answer the question most satisfactorily. In all the test comprises eight passages, and sixty multiple choice answers, including a vocabulary item. The time limit is 45 minutes. Some of the test items require inferential meaning, some even demand the writer's attitude to the subject matter. The test is standardized and validated by using empirical validity.

In addition to these tests, there are a number of tests, whose date of publication the writer could not obtain, that are of an analytical nature. A.F. Watts' "Sentence Reading Test 1"[1] consists of 35 uncompleted sentences. The English Test 2[2] is divided into two sections, 30 minutes to do each section. In section two, a short comprehension test is included. The test consists of: 1) Three passages, each followed by three uncompleted statements. The students should underline one of the four suggested alternatives to complete the sentence. Only one of the items deals with comprehension, the other two are concerned with vocabulary. 2) Three sections, each of which consists of a number of sentences. A word is missing from each sentence. The students must either supply a word, where some letters of which are given as a guide, or choose a word from given alternatives.

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1. National Foundation of Educational Research in England and Wales.

2. Morgan, G.A.V., ibid. The full form of these tests were obtained.

The other group of these same types of tests are American. They are referred to by A.J. Harris[1] as analytical tests. The Iowa Every-Pupil Test of Basic Skills[2] includes a silent reading comprehension test which consists of reliable measures of level of comprehension and vocabulary as well as a test of work study skills which has sections on map reading, use of references, use of index, use of dictionary and the reading of graphs, charts, and tables. Harris gives the absence of rate of reading tests as "the major short-coming of these tests". The California Series of Tests[3] contain an Elementary test for grades 4 to 6, an Intermediate test for grades 7 to 9, and an Advanced test for high schools and colleges. Each consists of four vocabulary sub-tests and three comprehension sub-tests. The Monroe-Sherman Group Diagnostic Reading Aptitude and Achievement Tests have obviously two parts. The achievement part includes paragraph meaning, rate, word discrimination, spelling and arithmetic. The aptitude part includes tests of visual memory, auditory memory and discrimination, motor speed, and vocabulary. Although these tests have been used in reading clinics, they might be suitable for use in classrooms, since they are group tests. The Silent Reading Diagnostic Tests by Bond, Clymer, and Hoyt try to provide a detailed analysis of both comprehension and word recognition

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1. 1961, pp. 175-176.
2. Ibid., p. 175.
3. Ibid.

skills. They have grade scores for vocabulary, and four comprehension and appreciation scores, as well as a profile chart which meant to show the strong and weak points in word recognition pattern, types of errors, visual analysis, and phonic knowledge. Harris suggests that this new test is "practical and will probably be widely used". The Doren Diagnostic Reading Tests consist of a number of sub-tests. Each has a specific purpose such as: 1) Providing an analysis of the word attack skill; 2) Indicating aspects of phonics and structural analysis that need strengthening.

There are also a few new tests that measure the English reading comprehension of foreign students. The test of English as a Foreign Language[1] is one of them. It contains five sections each of which measures a language skill. Section four is a test of reading comprehension ability in English. In this section of the test, a series of reading paragraphs is given. Each paragraph is followed by several questions on the meaning involved in the passage read. The student should select the one best answer from among four alternatives, A, B, C, and D, provided, to each question.

One of the unpublished tests in the field of English as a foreign language is Elizabeth Ingram's.[2] Mrs. Ingram's three-part test consists of measures of: 1) Sound recognition; 2) Intonation; 3) Stress (listening tests);

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1. Educ. Testing Service, Princeton, New Jersey, 1963.
2. Of the School of Applied Linguistics, Edinburgh University. The writer visited the school and met Miss Ingram who kindly let the writer see her test.

4) Grammar; 5) Vocabulary; and Reading Comprehension (writing tests). The reading comprehension test consists of four passages, each followed by several questions. Four multiple choice answers are provided for each item. The student has to choose the best answer, indicating his choice by putting a cross in the corresponding box. The comprehension of these items mostly depends on the structural comprehension of written English, though some of them require deep thinking.

Tests of Single Function

Speed

Speed tests, that measure the rate of reading words per minute and the comprehension of what is read per minute, are usually included in tests of silent reading in general. Some quite satisfactory speed tests, as we have already seen, are incorporated in the Chicago, Traxler and Iowa Silent Reading Tests. Gates' Reading Survey Test includes a separate test for measuring rate. The following is a sample of a standardized test of rate of silent reading which is taken from Gates' Reading Survey for grades 3 to 10 and reproduced by A.J. Harris.[1]

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1. 1961, p. 178.

Speed Test

Directions: Read these paragraphs. Draw a line under the word which best answers the question. Draw a line under one word only. Do the exercises as rapidly as you can without making errors.

Sample: The sun is warm in summer. Boys and girls like to swim and play games on the grass. When do we get very hot days?

Winter spring <u>summer</u> fall

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1. Mary was walking in the snow. She pulled her coat closer but the wind blew the icy snow against her face. What kind of day was it?

   Pleasant warm tiresome cold

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2. They were pretty, red woollen mittens. They were sure to keep out the snow. How do you think they would feel in the winter time?

   Cold heavy warm wet

Continue on next page

8. At night when all is still, a cat can hear tiny creatures moving. She can also see quite well on a dark night. What can see quite well on a dark night?

boy girl cat man

9. The blue roadster was in the ditch. The wrecking car got it out again with just one pull. What do you think the wrecking car had to be?

Beautiful strong old light

The Minnesota Speed of Reading Test for College Students[1] is another example of separate speed tests. The time limit for the test is 6 minutes, and the test has two forms. Unfortunately, the material of the test could not be obtained.

The third type of speed test is that designed for foreigners reading English. Alan Davies'[2] Battery of English Proficiency Tests includes a speed test which consists of a moderate length passage into which a number of foreign or irrelevant English words are inserted. The students are asked to

1. 1953. In: Witty, P., 1949, p.218.
2. University of Edinburgh, previously University of Birmingham, 1964.

underline those words while reading as fast as they could follow the meaning of the passage. The words may be easily located because they hinder the continuous meaning of the passage, since they do not belong to it.

From the brief survey of the work done in the field of reading - whether systematic experiments or tests - one can conclude that:

1. "Comprehension in reading consists of an exceedingly complex set of activities. In most of the older tests no attempt was made to measure different kinds of comprehension, but there is a distinct trend in the newer reading tests toward the measurement of more than one aspect of the whole complex process."[1]

2. To devise a test that includes the most important skills involved in reading in general and reading comprehension in particular, one has to explore the dense jungle of the literature available in the field of reading experiments and reading tests. The present survey, then, has been necessitated by the nature of the present investigation, which attempts, as one of its aims, to devise a test that includes different reading skills that could be measured separately.

The number of studies and researches carried out in the field of reading bears witness to the importance of reading, in individual lives as well as in nations' progress and prosperity. This is to be discussed in the following chapter.

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1. Traxler, A.E., 1932, p.29.

CHAPTER III

THE IMPORTANCE AND ROLE OF READING AND THE PURPOSE AND SCOPE OF THE PRESENT WORK

> "There are golden ages yet to be made and times of trouble to be survived. The book is a shield, a tool, a power-pack. It is an instrument for intellectual and emotional navigation. It is man's own sovereign remedy against the ill and confusions of a changing Universe. The more competent readers a society has, the greater will be its capacity for doing good to itself." 1

Reading as a Means of Communication

Reading is a tool through which a reader receives direct communication from those of other places and those of other times, whether past or future. It is through reading that people improve singificantly the quality of their thinking and the ways of their living. People improve individually; but this individual growth leads consequently to the development of communities and society as a whole. Good reading habits, without doubt, are important to everybody, to the teacher, to the lawyer, to the doctor, to the engineer, to the businessman, to all professional men, to the college student, and the busy housewife, who all know how to read already but who want to read better and faster to keep pace with the rapidly changing world. A person's failure to read adequately is an obstacle to his attaining full maturity

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1. Jennings, F. G., 1965, p. 196.

which is essential for twentieth century citizenship. It is the skilled reader, who learns by experience to turn to his paper or book with a definite purpose in mind, who has the biggest opportunity to weigh evidence, judge its relevancy to the current beliefs, and react beneficially, as a private person or as a citizen, to the viewpoint presented. Thus the value of reading is determined by its use.

Reading and School

Reading, as a tool, seems to be the basic ability that underlies success in almost all the subjects of the school curriculum. Therefore the emphasis which was formerly laid on 'learning to read' is now placed upon 'reading to learn' as a major goal in elementary education.[1] In this respect reading is a unique school activity; it is both a subject of instruction and a means for the mastery of other phases of the curriculum. Hence, teachers of all content subjects are considered to be teachers of reading too, since they, like teachers of reading, want their pupils to be able to find their way about the world of books and read them effectively as a learning tool or to enjoy and appreciate reading them. Reading, then, is mainly a tool. People read for a purpose, perhaps to be entertained, to get information, to follow direction or to solve problems. And people teach reading for

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1. Harris, A.J., 1961, p.4.

several purposes, "One of the purposes of teaching children to read is that they may ultimately be able to think for themselves."[1]

Obviously, education's and the educator's most useful contribution is in improving reading abilities. According to this concept of education, a child cannot be educated until he can read. Once he has learned to read, he possesses a power for independent study: "The knowledge stored in books is open to him, and many American reformers of curriculum see earlier reading as the route to acceleration of progress in such subjects as science and social studies."[2]

A child's development through reading is assured by giving him the opportunity to change - his attitudes, behaviour, and ways of thinking. Reading gives him experience; it helps him to grow by supplying him with an imaginative experience of the adult world; it prepares him to participate in the world of adults; and it even compensates him for the difficulties of growing up by providing a world of fantasy in which he can live pleasantly away from the difficulties of the real one.

A child's inability to read restricts his opportunity to think, since thinking is an activity that older people normally get through books.

C.A. Lefevre tells us that "Non-readers are much more than an economic

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1. Barbe, W.B., 1965, p.277.

2. Downing, J., 1964, p. xiii.

liability; they are deeply wounded human beings."[1] Research shows a great relationship between backwardness in reading and maladjustment. Reviewing the work done in this field, Monroe believes that failure to read is 'more frequently' the cause than the result of maladjustment.[2]

Preston likewise reports that the emotional and personality problems of some failures in reading could be solved by teaching them to read.[3] Gates clarifies the situation by giving a more precise estimate of the effect of reading backwardness on personality development in the following sentence, "My estimate is that among cases of very marked specific reading disability about 75% will show personality maladjustment. Of these, the personality is the cause in a quarter of the cases and an accompaniment or a result in three quarters."[4] J. Duncan puts his belief strongly as follows: "Pupils who have reached the secondary stage of education without acquiring useful reading skills have usually failed to develop in several ways."[5] Learning to read then is not only a skill and an activity on its own, but it is also a challenge to intellectual adventure, an accelerator to scholastic endeavour, and a power generator to growth and maturity. This tool is one

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1. 1962, p.3.
2. Quoted in: Sampson, O.C., 1966, p.186.
3. Ibid.
4. Gates, A.I., 1941, ibid., p.189.
5. 1953, p.24.

of the most powerful instruments that a school can offer its pupils.

At secondary level, reading is the most widely used means of acquiring knowledge in the content subjects. To this effect 'Bibliotherapy' is the best procedure in making the process of growing up both natural and normal for the secondary school students. However, learning to read should never stop. Even efficient readers in high schools and colleges must receive instruction in the art of reading - in critical reading. M.C. Letton believes that "when a student has been trained to make any page of general writing deliver to him its fullest meaning then a university or final highest school has done right by him, for it has placed in his hands the primary instrument of all higher education."[1]

Reading for university students is the most sound procedure to success. And this they need to use with precision and at a rate appropriate to their task. It is the university's responsibility, then, to satisfy this need. M.C. Letton quotes Carlyle as saying: "If we think of it, all that a university or a final highest school can do for us is still but what the first school began doing, teaching us to read."[2]

Another important aspect of reading is the emotional reaction. People react emotionally to reading material; and an emotional reaction is

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1. 1959, p.8.

2. Ibid.

creative reading. To this extent, reading brings depth of meaning, enlightenment, and pleasure. Certainly, students can react creatively not only to literary masterpieces, but also to reading matter of their special interests, such as science, mathematics, history, problems of democracy and so on, which could be a decisive factor in following a special career. Reading does not stop here; it serves as the most important factor in the individual's education of after-school days, since "High reading efficiency is required of every specialist in his or her own field."[1]

Reading a Foreign Language (English)

> "Even if we are born into the inheritance of a mother tongue which has the wide currency of a world-language, we need sufficient command of another language in order that we may have the key to what otherwise is locked against us and in order that we may more fully understand the meaning and value of words in the passage of thought and sympathy." 2

If it is so necessary for speakers of English to learn a second language, it is then obvious how vital it is for foreigners to learn English - especially those of developing countries. English is a world-language, a language of science and technology, and a language of a rich culture.

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1. Jennings, F.G., 1965, p.194.
2. West, M., 1926, Introduction.

To know only one's own language means a restricted scope of reading and hence of experience. The more languages one learns, the more books one can read and the wider experience one can enjoy. To keep to a certain extent abreast of the rapid scientific and technological developments, Arab countries, like all other newly developing countries, have to read either English, Russian, French, German, or any of the languages used in science and technology. It seems extremely difficult, if not impossible, to keep oneself informed of the developments in any branch of biology or medical science, if one cannot read English.[1] To read English, then, is a necessity, a truism for those progressing countries who wish to learn more, live better, and prosper.

If Arabic was one of the 29 languages used in science, one might think that Iraqis could, perhaps, follow scientific progress without having to learn a foreign language. But Arabic is not a language of science, and even scientific work in Arabic, if any comes into existence, has to be published in one of the languages used in science. Since English is the most outstanding and convenient language to learn, there is every reason for Iraqis to want to learn it and read it. There are some other reasons that make English the favourite foreign language to teach in Iraq. Since English

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1. Savory, T.H., 1953, p.151.

has been taught and learned in Iraq for about fifty years now, the teachers in schools are trained to teach English, the lecturers at the university lecture in English, and nearly all the scholarship students were and still are sent to English-speaking countries. In 1921-22 the first student was sent to England, while in 1956-57, there were 481 students in England, and 799 students in the United States of America.[1] The number of Iraqi students in the United Kingdom went up to 1,540 in 1965-66.[2] In short, the Educational system in Iraq revolves round the English language.

One might ask why the Iraqis have to read English. Can't they translate English books into their own language and stop bothering to learn a second language? The answer to this question is a simple and straight-forward one. Translaters cannot possibly translate in a life time the amount of material now published in the U. S. A. and Britain in a single day. Thus the more readers of English Iraq can afford to train, the more thinking men will be created; and consequently, Iraq can certainly progress faster than it is doing now, since reading is a lifetime process, it is "not a substitute for what we usually call real experience, and not

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1. Report on the Education in Iraq, Principal Bureau of Statistics, Ministry of Education, Republic of Iraq, 1956-57, p.171.

2. Overseas students in Britain, the British Council, 1966, p.33. Statistics of the number of Iraqi students in the U. S. A. are not available.

an ornament of embroidery which we can put on or leave off, but a part of life itself."[1]

The importance of reading is summed up in the following quotations:

"In order for one to be intelligent and informed about the world today - in order for him to be an educated man - there is an irreducible minimum of information and understanding which must be acquired, and this minimum is constantly increasing. Training to read with quick comprehension of essentials and, at the same time, depth of comprehension is a requirement." 2

"Where there is a reading man there can be a thinking man, and where he exists that part of the world can be better than it is now." 3

The Purpose and Scope of the Investigation

The Hypothesis

Reading skills and habits in any foreign language may be affected to a certain extent by the reading abilities and habits of the mother tongue (Iraqi University students taken as an example). This, if proved true, means that if one improves the reading abilities and habits of one language, either the foreign or the mother tongue, the other one will improve too. This will be of great service not only to Iraqi learners of English or other

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1. Fredrick, J.T., in: Diedrich, P., 1944, p.72.
2. Traxler, A.E., and Jungeblut, A., 1960, p.1.
3. Jennings, F.G., 1965, p.193.

foreign learners of English, but also to all learners of foreign languages.

Since Iraqi University students have been taken as an example, it is essential, as a first step to establish the validity of the above-mentioned hypothesis, to answer the following questions:

1) What is the reading speed of Baghdad University students to attain a reasonable level of comprehension of the reading purpose, in English and Arabic?

2) What is the quality of their reading in English and Arabic?

   a) What reading skills have they developed?

   b) What degree of maturity in reading have they achieved?

   c) How well do they comprehend what they read in both languages generally?

3) Is there any relationship between their reading in Arabic and their reading in English?

The true and accurate answers to these questions depend on a number of things. In the first place, a battery of tests of the skills that refer to the kind of experience Iraqi students have had, should be constructed. Secondly, an appropriate method of selecting material and devising test items must be adopted. Thirdly, a suitable way for selecting subjects for the test should be

followed. And finally, the statistical procedures through which generalizations are to be made must be identified. These are discussed and described briefly under the "Scope of the Investigation" sub-title.

The Scope of the Investigation

When Iraqi students come to the university, they enter on their course of higher education with a strong belief in their ability to read efficiently, if not English, their own language at least. To what extent this belief is valid has to be decided by an application of a test which consists of the basic skills of 'Reading', speed and comprehension; and the skills involved in each of these two basic skills. The test both in English and Arabic will be fully described in the next chapter.

The material to be selected to comprise the content of the test has to be either within the students' immediate experience or such as can be readily imagined by them. Otherwise it hardly means anything to them.[1] Although efficient readers are expected to read and understand and react creatively to all kinds of reading material, these students' efficiency in reading is not yet established. Hence, the material of the first test of reading they experience should be known to them. Later, it can go beyond what they already know and explore problems, situations, ideas, and ways of thinking and feeling they should know.

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1. Diederich, P. B., in: Supplementary Educ. Monograph, No. 58, 1944, p. 14.

To determine the reading abilities and habits of Baghdad University students, it was decided to measure the first and the fourth years' abilities only. The measurement of the second and third years is unnecessary. Colleges representing the faculties of Science, Arts and Social Studies are to be selected in order to provide a cross-section of the University fields of study. A representative number of students of each faculty in each year and for each version of test is to be drawn up also.

The statistical procedure to be followed in interpreting the raw scores of the students are to comprise: Means, Standard Deviations, Percentages, Correlations, and Component Analysis. The means, the S.D., and percentages are to be used to give a meaningful summary of the test results on the one hand, and on the other to show if there is any significant difference between the scores obtained from the English tests and those obtained from the Arabic versions of the tests. The correlation coefficient is used to find out if there is any relationship between the students' performance in Arabic and their performance in English. The component analysis is to determine if the skills chosen are different in kind and level or not, and if the same pattern of components is found in both the English version and the Arabic version of the tests.

Since the objectives of the present study are known, the skills and

subjects to be tested are identified, and the kind and uses of the statistics to be applied are stated in this chapter. The coming chapters are to show to what extent the objectives have been realized. The next chapter reports and describes the devising of the two forms of the tests.

PART TWO

THE MEASUREMENT OF READING ABILITIES

"If education is effectively to teach functional reading skills, it seems important that research discover their nature and develop tests."

(Hall and Robinson, 1945, p.429)

"The present century has seen extensive development in methods of measuring scientifically traits and abilities of human beings."

(Vernon, P.E., 1940. Preface)

CHAPTER IV

THE CONSTRUCTION OF THE TESTS

"The greatest difficulty in educational measurement is that of keeping the measure 'pure' - of measuring the one mental function and nothing else." 1

In Chapters I and II a detailed description of the meaning and the progress of reading research was given. The skills to be tested were delineated. A brief account of the reading situation in Iraq as well as in some technologically advanced countries, such as Britain and the United States of America, was given. In Chapter III the importance and the role of reading in people's lives were discussed and shown clearly, and the scope and purpose of this work were explained.

In the present chapter the description of the test, devised to answer the questions, in the previous chapter truly and accurately is provided.

Since there is no standardized reading test available for Iraqi students, a test of speed of reading and others of level of comprehension are constructed.

"A survey of the studies concerned with reading performance reveals a rather general agreement that reading ability is composed of at least two elements, i.e. speed and comprehension." 2

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1. West, M., 1926, p.141.

2. Tinker, M.A., 1939, p.158.

Hence, reading speed and comprehension are undoubtedly the two major skills associated with reading. In view of this fact an ability test of reading speed and of reading comprehension are devised.[1] Ability tests cover both aptitude and achievement tests.[2]

Speed Test

Since writers,such as Yoakam,[3] distinguish four rates of reading, skimming, rapid, normal, and careful rate, it is apparent then that there is no meaningful single rate (in w.p.m.) for any given individual. The rate of reading depends to a great extent upon such factors as the kind of material, whether easy and general, or difficult and specialized, and the purpose for which the reading is being done. Thus, a person reads at many different rates, each specific to certain purposes. The measurement of these purposes demands different speed tests.

The Purpose of Speed Test

Rapid reading is the purpose of the present reading test. Basically, the speed test aimed at discovering: 1) the reading rate; and 2) the speed of comprehension of all the sample students at Baghdad University. In a reading test it is very important to check comprehension in order to prove that

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1. A copy of the test is found in Appendices 1 and 2.
2. Tyler, L.E., 1963, p.57.
3. Yoakam, G.A., 1955, p.219.

reading is something more than eye-movement over the page.

The Material of Speed Test

The first and fundamentally most important step in designing a test is the selection of the material. To provide the necessary stimulus to read and understand what is being read, suitable material should be used. "Education can use any material, but it must be chosen with the personal development of particular people in mind."[1] Special attention was paid to news broadcasts. The preference of news to other types of reading material to be used inthe speed test was on the grounds that: 1) they make up part of the students' everyday talk; 2) they are most attractive to Iraqi students; 3) they can be used for students of different levels and different kinds of education; 4) the ideas involved in them are sufficiently straight-forward to be suitable for a speed test; 5) each contains one single theme; 6) each is short enough to encourage students to read on and hold their attention for a while; 7) each is short enough to facilitate scoring procedure; and 8) they lend themselves quite easily to translation. Thus, eight news broadcasts were selected.

The Technique of Speed Test

The eight small news broadcasts,[2] each consisting of a few lines, were

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1. Pattison, B., 1956, p.3.
2. They were translated from Arabic, their original source, to English by the B. B. C.

arranged according to their length, placing the shortest first in order to give the students an opportunity to show their speed of comprehension. The shorter the paragraphs, carrying units of ideas, the more units a reader can comprehend. The students were supposed to read these as rapidly as possible, always making sure, however, that at the same time, with the chosen speed, they could get the main idea of each selection. It is worth mentioning here that main idea test encourages speed. The comprehension of what was read was to be checked. The students were given 24 multiple-choice items consisting of 24 'news in brief', among which eight contained the main ideas of the selections read. These had to be singled out by the students to indicate their understanding of what they had read. Hence, the students had, while reading the multiple-choice items, to put a cross in the boxes, provided opposite each summary of news, corresponding to the selections read. These boxes were printed in a straight column, to facilitate scoring. As the comprehension of the speed test requires only identification of ideas, read beforehand and presented later among other ideas to the reader, it is called 'recognition' and not comprehension. This proved extremely useful in avoiding confusing the speed comprehension test with the actual reading comprehension.

The reading has to be done during a limited time. "The idea of measuring reading efficiency by the time taken to read a passage and understand

its content has been accepted for many years."[1] An objective scoring procedure has to be adopted also. By objective scoring is meant that the test can be scored by mechanical devices or by a person who has no special competence in the field. An objective scoring, then, is done automatically and without any sign of conscious thinking. No matter who does, or how many do, the scoring the result should be the same over and over again in an objective scoring. The multiple-choice procedure used in this test can be scored by machines.

The Comprehension Test

As the purpose of the comprehension test, in this experiment, was to measure level, and not speed of comprehension, it was thought wise to separate the comprehension from the speed test: "rate score should be independent of power of comprehension."[2] Hence, not only was a test of two distinct sections devised, but also a comprehension test of different skills and level of understanding was designed. And since writers, as was seen in Chapters I and II, characterize reading comprehension by many different levels or powers of receiving meaning from printed material, comprehension could mean many different things. It could mean understanding what is written within the lines, what is written between the lines, or what is written beyond the lines. The last two mean reading for intelligent interpretation and criticism.

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1. Bayley, Harry, 1957, p.22.
2. Blommers and Lindquist, 1944, p.454.

The Testees

It is necessary to identify the subjects for whom the test is to be devised. The students at Baghdad University were chosen for the purpose of carrying out the present investigation. This decision was taken because:

1) "While the seeds of backwardness in reading may be sown in some children from the time they enter a school at the age of five, and indeed before school entry, it would be true to say that the problem of backwardness in reading is most evident and most acute among older pupils at secondary school of education."[1] The ability of many Iraqi postgraduate students, especially those who come to this country to specialize in medicine or surgery, to read efficiently is doubted as a result of their successive failure in examinations. Since this is the situation, the present investigation is concerned primarily with older pupils, especially those at senior stages, whose academic attainments tend to be rather affected by their inability to use reading. Perhaps their inability to pass English examinations is due to the fact that their examinations at home emphasize ability to remember,. while the English examinations demand answers that show interpretation and application of what is read.

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1. Duncan, 1953, p.9.

The students to be tested were composed mainly of two groups: the first-year and the fourth-year students. Each group was divided into three sub-groups: Science, Arts, and Social Studies.

The Comprehension Test Material

While the speed test was devised to evaluate the students' speed of comprehension, the comprehension test was constructed to measure their level of comprehension. The first obstacle that a test designer faces is the problem of choosing suitable reading material. Different material should be used for different purposes. Since at college level reading is nearly always concerned with specific fields, such as science, literature, and social studies, the material for the present reading comprehension test, then, had to be specific to the students' different fields of study. Thus the material in the test was selected after careful study of the kind of reading the students were doing during their studies, because "very few people are equally good at comprehending all kinds of reading material, and tests designed to measure specific kinds of comprehension are of considerable value above the primary grades,"[1] and because, "the basic interest in the subject itself is of course an important factor".[2] Moreover, it was thought wise to choose a material with which the students were quite familiar (i.e. the material has

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1. Harris, A.J., 1961, p.162.
2. Fry, E., 1965, p.135.

been read by the students) on the basis "that people's minds flinch from, are numbed by, the alien, whereas they respond readily to the familiar."[1] Certainly, if a student is given unfamiliar material to read, it would be rather hard for him, and consequently he gets bored and may stop reading, or his comprehension of the material may be very poor. Even if he tries hard to go through it, it takes him an excessive amount of time to do so. It is extremely discouraging for a student to get a deep meaning out of material, when it is difficult for him to get its plain sense. On the other hand, if the material given to the student is known to him, he may find it promising for a test and interesting to deal with in a way different from that he is used to. The difficulty of understanding a written message is decided not only by the complexity of the sentence structure, vocabulary, and the style of writing, but also by the difficulty of the ideas involved. In order to find out how efficient a reader is in any of the foregoing skills, the others have to be, then, controlled. Thus, as the intention of this research is to find out how good the Iraqi students are at understanding thoughts and ideas, the structural, lexical and stylistic elements were controlled by using, for the test, material that the students had studied. "The selections chosen should be... representative of reader-material of that level in language and vocabulary."[2] Only the

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1. Berry, R., 1965, p.556.
2. Harris, A.J., 1961, p.156.

material chosen for the fourth-year Arts was not studied in the college, but it was made certain that the students had read it outside the classroom. In spite of this, all the meanings of words, thought to be new to the students, were given to them. The student, by studying particular material, must have became familiar with its structure, vocabulary and style.

Another difficulty arose in selecting material. It seemed next to impossible to get material from the texts the students studied in their first and fourth years. Since ample time is required to construct a test which is valid and reliable, and even more time is needed to get the information wanted concerning the amount of the material covered by the student during the first half of the year, the possibility of using the material the student studied during October 1967 - February 1968 was out of the question. To solve this problem, it was decided to use the material the student studied in the previous years. The investigator was able to get hold of this material, though with difficulty.

The reading material for the first-year students' test was selected from an English text, George Eliot's "Silas Marner", studied by the students in their last year of the secondary school, the year before entering the University. Since all the students studied the same book the material was the same for all the students, those of the Science branch and those of the Arts Branch.

The material of the fourth-year students differed according to the students' field of specialization because: 1) "The student whose values or whose experiences are alien to the material he is reading is unlikely to comprehend fully and clearly";[1] 2) "Whenever testing a student at an advanced level we therefore become involved with his knowledge of whatever subject he is reading, writing, or talking about";[2] 3) Different fields of knowledge have different languages which are clear to the pursuer of that field.[3] Each of the Science, Arts, and Social Studies field has its own special register, which is best known by its own readers. And the reading material for each group was selected from the books they had studied in the earlier years at the University, with the exception of the fourth-year arts group, as has already been mentioned.

The sample of the Science group consisted of students from the College of Medicine, the College of Engineering and the College of Sciences, Department of Chemistry and Department of Physics. The selection of material, then, had to be based on a subject common to all the colleges. The first and more usual practice was to base the choice of a subject on the study of the courses which were followed by the students in the different colleges. The result showed that chemistry was taken by all

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1. McKillop, A., and Yoloye, E.A., 1962, p.103.
2. Perren, G., 1967, p.103.
3. Savory, T.H., 1953, pp.91-93.

the colleges. Though there was no standard introductory course in chemistry offered by all these colleges, there was a fairly universal agreement on certain topics. "General and Inorganic Chemistry", by P.J. Durrant,[1] which was a text at the College of Sciences, was found to have covered most of the topics the colleges concerned dealt with. Consequently, five passages from that book were selected from three topics that were among the most common areas of study in the three colleges.

In the selection of the material for the arts students' comprehension test, a close approximation to the same level of difficulty as the literary books they studied was aimed at. As content, of course, and emphasis on a certain area rather than another, varied widely from the College of Arts to the College of Education, it was practically impossible to select material for the reading comprehension that would satisfy the students of both colleges. Although "to learn a language, even one's own, it is necessary to know some of the cultural background",[2] it was greatly doubted if the cultural background of the English literature was taught to the students of English literature at the University of Baghdad. Since the cultural background of English literature may be alien to the Iraqi students, it was thought better to limit the material to the reading matter used by the students outside the college. Jabran's "The Prophet" was selected, and four passages, which were thought tc be the most

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1. 1959, Butler and Tanner.
2. Fry, E., 1965, p.25.

agreeable to Iraqi taste, from the book were chosen on the basis that "unless the field of knowledge is one in which an exceptionally strong curiosity has been aroused, it seems that the emotional and imaginative satisfaction must be there as a kind of bait."[1] "The Prophet" was both interesting and readable for the Iraqis. Its ideas correspond to Iraqi ideals and principles, and hence, were comprehensible to them. The fifth selection was a piece of Arabic poetry.[2] The difficulty of idea is, of course, only one factor in determining the difficulty of reading matter. Some of the others are complexities of grammar, sentence structure, and vocabulary. While the ideas and the grammatical structure of "The Prophet" and the poem are certainly not above the fourth-year university students, the few elements of vocabulary which may be difficult are explained in the content of the test. "Familiarity with words and constructions so that the mind is free to devote itself to matters of analysis, weighting, relating and thinking things together is a great help towards enabling what intellect one has to operate optimally."[3] The material for the social studies' comprehension test was taken from "The Elements of Commerce for Beginners",[4] a book which was studied by both the College of Economics and the College of Commerce students. Five

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1. Whitehead, F., 1966, p.46.
2. By Umar Ibn Abi Rabi'a, translated by Arberry, A., 1965, p.40.
3. Thorndike, E.L., "Improving the ability to read," Teachers' College Record, October-November-December, Columbia, N.Y., 1934, quoted in Massey, 1965, p.96.
4. Clark, Mathew, Burleigh Press, 1953.

passages were selected from this book too. They and all the other passages were selected according to their relative importance in the books chosen from or the courses related to. Care was taken to make sure that they were of reasonable length, taking no more than a page at most. The passages selected within each field were more or less of the same difficulty. The aim of the test was not to give the students passages of different difficulty, but to set questions of different difficulties, testing different skills, on each passage. Mcintyre reports[1] thatGates' paragraphs were of equal difficulty too.

Other Aspects in Devising a Comprehension Test

Once the material for the comprehension tests is decided upon, attention should be given to the many and varied operations that are necessary for producing a test. Not only does this involve selection of material and naming of tests (such as speed or comprehension), but it must also involve careful description of the kind of skills to be tested, the types of items to be constructed for testing those particular skills, directions for the students, directions for the examiners and scorers, arrangements for the tryouts and provision for experts' reviews.

Skills to be Tested

Before actual construction of items begins, a comprehensive outline of the skills to be tested should be given. Since reading comprehension, as

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1. 1935, p.14.

defined by many authorities in the field and discussed in the first chapter of this work, is the product of many skills combined, tests of as many skills as possible should be devised. But as it is next to impossible to administer a reading c amprehension test that embodies all the skills that an efficient reader possesses, it was thought wise to select skills that are appropriate for Iraqi university students. The selection was not based on the definition of the readers' abilities. Since these students had never had a reading test, it was very difficult, though important, to define what kinds of readers they were. Hence, the decision was an approximate assumption based on the personal experience of the investigator, as an Iraqi learner and teacher, of the students' abilities and needs.

Since "satisfactory measurement requires not only an accurate measuring instrument, but also a clear notion of what is to be measured",[1] it was decided to find out the students' abilities to answer questions, the answers to which are either literal or inferential in general. But at the same time, these two general skills involved items at different levels of difficulty. These items are questions, the answers to which are: 1) directly seen in the passage; 2) very simple inferences;3) fairly simple inferences; 4) inferantial, and 5) highly inferential. These types of questions which were mainly decided upon with the aim of improving reading among Iraqi students, were hypothetical:

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1. Perren, J., 1967, p.10.

whether or not the skills, categorized in this way, are in fact independent and separately measurable is a question the answer to which is left to statistical analysis. By the word "inference" here is meant that meaning which goes beyond the literal meaning of the printed words, and requires even more complex skill for greater depth of comprehension. University students must have mastered many of the basic reading skills and are in the process of refining and using these skills effectively.

To round off the discussion, it is found that the task of improving reading is difficult without an evaluation to identify areas of the Iraqi students' strong and weak points. Thus, the device of a test that embodies items of the several levels of reading comprehension was decided. The primary skills were included in the test in order to see if they were yet mastered; the inferential skills were included to serve as a guide to identifying the reading deficiencies of the students and in prompting, eventually, greater reading efficiency among them.

Item Construction, Technique and Discussion

To devise a test for each selected skill seemed impracticable and beyond the administrative capacity of this work. A test that consists of tests for all these skills would be a long one, too long to administer at one session; and long enough to bore the examinees and induce fatigue in them, and, consequently inhibit the students' participation in the test. It is obvious that no single test or procedure can measure all the skills selected. Thus, different

types of questions, from the straight forward to the more complicated one that needs inference, were assigned to each reading passage in order to ensure growth in the phases of comprehension already mentioned. The level of difficulty of the skills to be tested was kept in mind while constructing the questions. Some were simple and straight-forward, others were complex and asked for intelligent thinking. To have the students provide very short and uniform answers, every effort was made to avoid ambiguity and make each question as exact, as clear cut, and as concise as possible. The aim, through the process of choosing material, and constructing items for the tests, was to arouse the students' interest and co-operation. Hence, all the passages and the questions based on them used in the present investigation, were selected on the basis that they were directly related to the students' interests.

In order to determine fully the nature of the reading difficulty of Iraqi University students, efforts were concentrated on forming questions in such a way that: 1) The correct answers could not be given by reading the questions without reading the passages first; 2) The answers supplied by the student show their ability to decode a printed page when its vocabulary and grammar are known.

In constructing the comprehension items special effort was also made to construct objective items. It is worth noting that objective items are usually divided into two main types. On the one hand there is the short-answer (supply type) form, and on the other hand there is the multiple-choice (the new type) items. The short-answer item is a form of the essay answer. There

are many arguments against and in favour of both the essay-type and the multiple-choice items. This chapter will not discuss and examine the points in favour or against any one of them in detail. Yet a brief reference is thought to be enlightening.

Those who support the essay-type item argue that the ability to supply an answer is more useful and shows higher mental power than the ability to select an answer from suggested alternatives. The supporters of the multiple-choice items see the essay-type answers as inaccurate, subjective and hence not valid. Vernon, P.E., concludes that "both types of examination are imperfect measurements and open to much the same objections."[1]

However, the short-type answers, which are another form of the essay-type, are universally agreed to have been credited with high validity and reliability: "Tests of recall items were designed because they are more reliable".[2] The element of guesswork, which may be strong in a multiple-choice item, is absent in the short-answer items. Moreover, the alternative (wrong) answers are usually constructed in such a clever way that could deceive even the clever students, and those students who have a good command of the language. This fact, as it plays an important role in the interpretation of results, is of great importance. Vernon believes that the short-answer forms, if well designed and

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1. Measurement of Abilities, 1940, p.257.
2. Ibid., p.249.

controlled, "possess the merits of both the essay-type and the new-type test. They, like the new-type test, 'tape' all the relevant knowledge with much less waste of time, and prevent the candidate from producing irrelevant material".[1]

However, the short-answer form, which consists of words, number, or any other symbols that the students supply as a response to the items, was chosen for the present test. From all that was said above, it was thought that by combining the two types of tests (the multiple-choice and the essay-type answers), "the respective errors partially cancel one another out, and the total validity is definitely superior to that of either the separate types".[2] It seems that all the misconceptions concerning the value and applicability of the short-answer items have arisen from the difficulty of scoring them by machines. There is no doubt that most short-answer items could be constructed in such a way as to be scored either right or wrong. It is, then, a matter of opinion whether to sacrifice ease of scoring for higher values of comprehension or to sacrifice measurement of higher achievements in comprehension for the facility of scoring. Nevertheless, the investigator concluded, from all the contradictory statements concerning the two types of tests, that the free recall, as is the case in short-answer forms, is not only

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1. Ibid., p.250.
2. Vernon, P.E., ibid., p.249.

more difficult than, but also more valuable than, an aided recall offered through multiple-choice items. Hence, she decided to construct questions the answers to which are short-answer types whenever possible.

Yet, expreience has shown that not all types of questions are best answered by short-answer items. Some items, such as giving the best title to a reading text or giving a reason for a certain behaviour may not have a definite answer or may have more than one definite answer. Though this problem can be solved by preparing a detailed model answer sheet to be used for scoring, if scoring is to be done by hand, yet it would be advisable to use the form, whether a multiple-choice or a short-answer form, which best serves the purpose of the test.

As a next step an adequate number of items on each passage was constructed. The questions on each passage were put on a single page in order that an examinee did not have to turn a page in the middle of any passage. This particularly helps to approximate to a given time for dealing with each passage.

Answer Sheet Design

Each question had to have one answer and only the one answer. Thus, a special answer sheet was prepared in order to control the number of words the students had to supply and consequently increase the probability of getting uniform answers. An answer sheet was prepared for each passage.

On each of the answer sheets were put the numbers of the questions, and against each of them a number of sets of three dots to indicate the number of words that constituted each answer. A set of three dots meant the answer to be supplied by the students had to be one word. Whenever a question demanded an answer which was not definite or had more than one definite answer, or asked for a long one, a multiple-choice answer was used.

At the same time, a model answer sheet was prepared for the scorer, where the answers were printed on top of the dots. The scoring had to be done by comparing the students' answer sheets with the model answer-sheet.

Length of Test

To determine the length of the test some passages of Dr. Fry's[1] drill book for improving rate of reading were given to some educated English personnel. An idea, then, was formed about the length of the material that English students could read and comprehend in an hour. On this basis, the length of the tests, five passages, and the questions on them ranging from 8 - 10 was arrived at. As the items of the test were fairly heterogeneous in nature, a test of less than an hour's duration was rather out of the question. It is perhaps worth pointing out that no time limit was assigned to the test of reading comprehension. Enough time was allowed for all the students to do all the items. Time was not limited, because the reading comprehension test

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1. Reading Faster, A Drill Book, 1965.

was devised to measure power of comprehension and not speed of comprehension.

Directions to Examinees and Testees

When the test was ready, a number of memoranda were drawn up; one to deal with the general instructions of how to administer the tests; a second to give detailed directions to the students explaining how to deal with the tests in general and how to deal with each part in particular; and a third one to give clear instructions about scoring the tests. Since the investigator strove to make the test as self-administering as possible, the instructions formed a minimum of supplementary explanations. Yet, the instruction manual, which is attached to the test and seen in Appendix I, tells clearly and exactly how the test should be given, taken, and scored. The manual of instructions will be very useful for two purposes: 1) the part concerning the administration and the scoring of the tests will be used in the future by all who give the tests; 2) it will impress upon the tests' users the prime importance of carrying out exactly the instructions given, and being familiar beforehand with the method of administering the test. In the instructions for the scoring of the tests, "the scoring formula, the weighting of items, and parts of the tests, the kinds of provisions for responses and the types of keys to be used"[1] were supplied.

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1. Traxler, A.E. In: Lindquist, 1951, p.365.

Pooled Judgement

The tests then were ready to be judged and evaluated by a "pooled judgement of recognized authorities in the field".[1] It was thought necessary that the review and the evaluation of the test items should be done from three points of view: 1) the accuracy and appropriateness of their subject-matter, content, 2) their technical merits apart from content, and 3) their editorial quality. Accordingly, the fourth-year social studies items were judged and approved by Mrs. D. Hinchcliff.[2] The items of the fourth-year science tests were checked by Faraj Haba.[3] The items of the first-year test and the fourth-year Arts Group test were checked together with technical editorial qualities of all the tests by B. Pattison,[4] and J. Barnett.[5]

The Arabic Form of the Test

Although there is a close link between reading and language, a student's reading inefficiently might not be due to language difficulties. Is it language or is it lack of reading ability that handicaps Iraqi readers if they are at all handicapped?

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1. Davies, F. B., in: Lindquist, 1951, p.286.
2. A lecturer in the Law Department at S.O.S., University of London.
3. Ph.D. Chemistry, Imperial College, London, 1966. Ph.D. Chemistry, Queens University of Belfast, 1963.
4. Professor of Education at the Institute of Education, University of London and the supervisor of this work.
5. Previously a lecturer at the Institute of Education, University of London.

To answer this question the tests have to be written in Arabic as well as English. They were translated not only because the results of the English tests would not tell whether the students have done poorly because of the language problem or because of lack of ability in reading skills, but also because the intention of the present investigation is to see if there is any relationship between the reading skills in the two languages.

As has already been said, all the test material was translated with the exception of the fourth-year Arts material, which has already been referred to in an early part of this chapter, and which was available in both languages - Arabic and English. This ready translated literary material was of great help. It seems generally agreed that difficulty of translation is most acute in the field of literature. And most of the difficulties that provoke differences of opinion occur in translation of literary material. These differences are mainly based on the translators' purposes. The argument usually is whether a translator has to put the sense of his author into a different language, or whether he has to strive to produce a reflection of the author's style and tone. As it seemed hard to obtain an agreement about what a literary translation should be, the ready-made translation of a literary masterpiece was looked for, for the fourth-year arts group test of the present investigation. "Translation is an art" is used quite frequently to describe the act of translation about which much has been written. But this 'art' is much simpler, and more accurate, to

use when translating scientific material. As "Language is the vehicle of ideas"[1] it is essential to use in translation a language that serves as an equivalent 'vehicle' to the one that carried the original thoughts. Thought must be passed on accurately, and the language of science, being lucid, direct, and undecorated, makes the task of transferring ideas from one language to another quite objective. This task has been made even easier by the nature of the scientific vocabulary, which is self-explanatory, consistent in meaning, unmodified by association, and never distorted by every-day speech, and grammatical structure.

Summary

Comprehension means to get meaning - meaning through vocabulary, through grammatical structures, through culture, and meaning above and beyond all these. As the aim of the present investigation was to find the ability of the student to get the last meaning out of a text, the other meanings were kept constant. It was thought that for each of these meanings a different test has to be given. Measurement of vocabulary, grammar, and culture was excluded from the test, not because it was not thought important, but because its control would help to pin-point the students' weaknesses in answering specific questions.

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1. Savory, 1953, p.11.

CHAPTER V

THE STANDARDIZATION AND TRYOUT OF THE TESTS

"The accuracy of prediction will clearly depend on the use of proper sampling technique in trial testing." [1]

Standardization implies quite a number of purposes that a test constructor has in mind in order to provide a test that is valid, reliable, administrable and economical.

To secure the above mentioned factors, namely validity, reliability, administrability, and economy, a designer of tests for foreign learners of a language has to administer the test to a group of native speakers of the language who are of the same educational level as those for whom the test is intended.[2] Assuming that the native speakers of the language know it very well, they should score very high marks on each item of the test, otherwise factors other than those of language will be suspected to have been introduced into the items of the test.

Accordingly some tryouts were planned to:

1. Identify defective, non-functioning, vague, or ambiguous items that needed improvement or elimination. Quite often, items, the answers to which might be appropriate, are remote from the intention of the test purpose.

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1. Brown, J., 1966, p.19.
2. Lado, R., 1962, p.328.

2. Guarantee uniformity of procedure in administration and scoring the test.

3. Ensure the clarity and precision of the directions to examiner and examinee. Since it is difficult to be sure that the printed instructions are always entirely unambiguous, standardization plays a major part in establishing suitability and accuracy of the detailed directions for administering, as well as taking, the newly developed tests.

4. Detect weaknesses in the answer sheets and the provision for responses; in the sample or fore-exercises; in the typographical format; and so forth.

5. Determine how many items should constitute the finished test.

6. Decide the appropriate time limits for each part of, and the whole of, the finished test.

7. Find out, and seek guidance in meeting, unforeseen difficulties, since some of the test devisors do not foresee difficulties which others may raise in the tryouts.

Usually in tryouts, test designers try to discover the items which are either very difficult or very easy. In the present investigation this point has been overlooked. Since one of the purposes of the comprehension tests was to measure abilities or skills that should have been mastered by the Iraqi students,

the very easy items were not, and the very difficult ones were, excluded from the tests after standardization. Moreover, the test was not intended to discriminate among the Iraqi individuals tested. Its purpose was rather to ascertain their mastery of certain comprehension skills.

Since experience always shows that tryouts are invaluable in respect of creating tests that could be almost perfect or near perfect, a plan for the tryouts was decided upon.

As has already been mentioned in Chapter IV, a large number of items were prepared for each test. The investigator tried hard to obtain samples that represent the educational level of the students for whom the tests were designed. Twenty-five sixth formers of a grammar school were chosen for the tryout of the test designed for the first year students at Baghdad University.

Three groups of the P. G. C. E.[1] students were selected for the standardization of the tests devised for the fourth-year Baghdad University Students.[2] The test designed for the science group at Baghdad University was standardized to a group of P. G. C. E. students who were doing chemistry; the test of the social studies group was administered to a group of the Geography Department; and the literary group test was tried on a group doing English. These tests were distributed to the students at random by either the

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1. Post Graduate Certificate in Education.
2. Access to Bushey Grammar School and to the University Departments was arranged through Mr. T. R. Holland, the Organizer tutor at the Institute of Education, University of London.

heads of, or the responsible persons in, the departments concerned. Detailed instructions for the testees were provided. The subjects were made aware of the importance of timing themselves. The results showed that all the students followed the instructions closely; and timed themselves on each part and each exercise accordingly. Each recorded the time of beginning and the time of finishing each exercise. Though the students were asked to comment on the test in general, and on the instructions in particular, they all made only one comment which indicated that the instructions were clear and easy to follow.

The GCE test was administered by the investigator herself. Different instructions were given to these students. Since the time during which the test was to be carried out was only an hour, it was thought necessary to familiarize the students with the instructions beforehand. Thus the instructions were given to the students a day before the actual test took place. Yet, some time was also taken, at the beginning of the test hour, to go through the instructions quickly and ask the students if there was anything that was not clear to them. The test was finally carried out according to the manual of instructions,[1] the answer sheets were collected, and scored according to the planned scheme.[2]

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1. See Appendix 1.

2. See Table 2B, Chapter VI, p.156.

The results of the preliminary tryout on 85 students, 25 G.C.E. students and 60 P.G.C.E. students, are tabulated and presented in the following pages.

The Speed Test

Tables 1 and 2 show the results of the speed test which was taken by all the twenty-five G.C.E. students and only eleven of the P.G.C.E. students who were doing English.

Table 1, which presents the G.C.E. data of the speed test, shows that the average speed of the students is 191.24 words per minute with 69 per cent of comprehension. Seventy per cent is normally regarded as a reasonable comprehension achievement in a speed test.[1] Obviously these students' average of comprehension is very near the requirement. This suggests that these students chose the right, the maximum, speed to comprehend reasonably well what they read. They could not possibly read faster and maintain the level of comprehension they attained at their previous speed.

Five of the students read at a rate of 275 words per minute; eight read at a rate of 211 w.p.m.; six read at a rate of 163 w.p.m.; and five read at a rate of 128 w.p.m. Only one student read at a rate of 95 w.p.m. and with only 50% comprehension, which is rather low. Those with 100%

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1. Fry, E., Reading Faster, A Drill Book, 1965, p.XI.

TABLE 1

G.C.E. Speed Test

Reading Time = One Minute

No. of Students	Selections read P.M.	Correct Answers	Percentage of correct answers
1	7	7	100
2	7	7	100
3	7	7	100
4	8	7	87.50
5	7	6	85.71
6	6	5	83.33
7	5	4	80.00
8	5	4	80.00
9	5	4	80.00
10	5	4	80.00
11	7	5	71.43
12	7	5	71.43
13	6	4	66.66
14	6	4	66.66
15	8	5	62.50
16	8	5	62.50
17	7	4	58.14
18	6	3	50.00
19	6	3	50.00
20	6	3	50.00
21	8	4	50.00
22	8	4	50.00
23	4	2	50.00
24	7	3	42.86
25	5	2	40.00
Total	161	111	1718.72
Mean	6.44	4.44	68.75
Average of W.P.M.	191.24		

TABLE 2

P.G.C.E. Data On the Speed Test

No. of Students	Selec. Read	Time P.S.	W.P.M.	Correct Ans.	%age of Comp.
1	8	33.30	500	6	75
2	8	36.60	450	6	75
3	8	39.30	420	7	87.5
4	8	41.30	400	6	75
5	8	45.80	360	5	62.5
6	8	46.50	342	5	62.5
7	8	46.50	342	5	62.5
8	8	48.60	340	6	75
9	8	51.60	320	6	75
10	8	51.60	320	6	62.5
11	8	55.00	310	5	62.5
Total	88	496.10	4104	63	775.0
Mean	8	45.1	373	5.72	70.45

Selec. = Selections

P.S. = Per second

W.P.M. = Words Per Minute

Ans. = Answers

Comp. = Comprehension

comprehension read at a rate of 211 w.p.m., which is very high. These students must read at a higher rate, because their comprehension would not suffer much.

Table 2 exhibits the speed test data of the P. G. C. E. students, They read at a rate of 373 w.p.m. The fastest student read at a rate of 500 w.p.m.; and the slowest read at a rate of 310 w.p.m. One of the students read at a rate of 420 w.p.m. with 87% comprehension. Certainly this student could read this type of reading matter even faster with no loss of comprehension. To get the general idea of a passage, one does not need to read in detail.

The Comprehension Tests

In the following pages, the result of the standardization of four comprehension tests devised for four different groups are tabulated. Table 3 shows the G. C. E. students' response to each passage and to each question put on each passage. Tables 4, 5 and 6 display the data obtained by the responses of three specialized groups to comprehension questions put on passages taken from the literature of their field of specialization, namely, science, literature, and social studies. . However, all these tables are intended to show clearly the principles according to which items for the finished tests were selected.

Before proceeding to describe the process of choosing the items for the final tests, another tryout, which decided the final length for the test, should be referred to. The tests were given to a dozen Iraqi students, studying in

TABLE 3

G.C.E. Students' Scores On Each Question of the Comprehension Passages

No. of Passage	No. of Correct Responses to Questions												
	1	2	3	4	5	6	7	8	9	10	Total	Mean	Percent
1	10	23	23	23	25	15	9	6	6	2	142	5.68	56.80
2	16	25	25	20	2	5	12	7	25	23	160	6.40	64.00
3 **	23*	24*	25*	25*	25*	24	12	24*	23	22	227	9.08	90.80
4 **	23*	15	24*	24*	24*	4	20	25*	19	18	196	7.84	78.40
5 **	24*	4	14	23*	23*	24*	24	15	25*	20	196	7.84	78.40

** Passages selected for the finished test.

* Items selected for the finished test.

N = 25

TABLE 4

P.G.C.E. Students' Scores on Each Question of the Comprehension Passages

SCIENCE GROUP

No. of Passages	No. of Correct Responses to Questions												
	1	2	3	4	5	6	7	8	9	10	Total	Mean	Percent
1 **	19*	17	19*	16	19*	20*	17	20*	-	-	147	7.35	91.88
2 **	16	17	20*	18*	19*	19*	16	20*	17	-	162	8.10	90.00
3 **	19*	20*	18*	12	17	19*	20*	16	-	-	146	7.30	91.25
4	20	16	18	16	10	16	18	19	15	-	148	7.40	82.20
5	20	15	18	15	16	15	15	12	-	-	126	6.30	78.75

** Passages selected for the finished test.

* Items selected for the finished test.

N = 20

TABLE 5

P.G.C.E. Students' Scores on Each Question of the Comprehension Passages

ARTS GROUP

No. of Passages	No. of Correct Responses to Questions												
	1	2	3	4	5	6	7	8	9	10	Total	Mean	Percent
1 **	19*	18*	16	16	19*	20*	17	19*	17	16	177	8.85	88.50
2 **	18	18*	16	17	20*	19*	20*	19*	-	-	147	7.35	91.88
3 **	18*	19*	19*	20*	17	20*	19	17	-	-	149	7.45	93.13
4	17	14	16	18	17	18	16	14	-	-	130	6.05	75.63
5	15	16	14	14	15	16	-	-	-	-	90	4.50	90.00

** Passages selected for the finished test. * Items selected for the finished test.

N = 20

TABLE 6

P.G.C.E. Students' Scores On Each Question of the Comprehension Passages

SOCIAL STUDIES

No. of Passages	No. of Correct Responses to Questions												
	1	2	3	4	5	6	7	8	9	10	Total	Mean	Percent
1 **	18	16	18*	16	19*	19*	19*	20*	-	-	145	7.25	90.62
2 **	12	20*	20*	20*	20*	19	20*	18	-	-	149	7.45	93.19
3	15	18	20	20	16	20	16	15	-	-	140	7.00	87.50
4 **	15	19*	20*	18*	20*	20*	14	16	-	-	142	7.10	88.75
5	12	15	17	18	19	18	18	18	-	-	135	6.75	83.88

** Passages selected for the finished test.

* Items selected for the finished test.

N = 20

London, individually. This was done unofficially, either by direct communication with the students or through friends. The test devised for the first-year university students was given to three undergraduate students. The other tests were given to three postgraduate medical students, three postgraduate students in law, and three postgraduate students, two doing teaching of English, and one doing history. The results revealed extreme individual differences in both speed and comprehension.

On the whole, the Iraqi readers proved to be slower than the English readers. The fastest reader, a postgraduate student who spent nine years in this country and during which he was awarded the B.Sc. and M.Sc. degrees, read at a rate of 180 words per minute only. The slowest student, a postgraduate in law, read at a rate of 100 words per minute. The average speed of reading was 150 words per minute.

The comprehension test, though taking more time than was expected, showed quite a satisfactory result. One of the law students answered all the questions correctly; six of the students answered eight questions correctly on each passage; four had seven of the answers of each section correct; and one student had only five answers on each passage correct. All the students registered the time when they started the test and the time when they finished it.

On the basis of the data obtained through the two tryouts, the items

selected and presented in the following tables are to be assembled in the final form of the test. Table 7 shows the items chosen for the finished test constructed for the first-year students at Baghdad University. Tables 8, 9 and 10 reveal the selected items for the fourth-year students of the same university.

The demand for high percentages of correct responses to each item is regarded necessary, because the English students 'know' the language. Besides, they have been trained to read well since their early childhood. Hence, they must be better readers than the Iraqis. Vernon[1] suggests that training and experience improve upon the readers' born potential ability by saying: "ability is obviously to some extent a matter of interest and practice". Even some investigators, such as Anastasi, A., 1936, "have proved that the factors extracted from a set of mental tests alter progressively with practice at the test".[2] Moreover, Leedy points out that "top flight readers are not born; they are made".[3] Other researches[4] show that the reading ability in U.S.A. has been improved. Likewise, the reading ability in Britain could have been improved as the result of the tremendous work devoted to the improvement of teaching reading. Hence, an item which is not answered correctly by the large

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1. 1940, p.155.
2. Vernon, P.E., 1940, p.160.
3. 1956, p.2.
4. Studies such as those of Finch, F.H., 1949, Gray, W., 1949, and Witty, Paul, 1951, in: Traxler, A.E., & Townsend, A., 1955, pp.233-235.

TABLE 7

The Passages and Questions Chosen for the Final Test

FIRST YEAR

No. of Passages	No. of Correct Responses to Questions **							
	1	2	3	4	5	Total	Mean	Percent
1*	24	25	25	25	24	123	4.92	98.40
2*	23	24	24	24	25	120	4.80	96.00
3*	24	23	23	24	25	119	4.75	95.00

* They were originally numbers 3, 4 and 5. See Appendices 2 and 3.

** The questions of passage 1 were originally Nos. 2, 3, 4, 5 and 8.
The questions of passage 2 were originally Nos. 1, 3, 4, 5 and 8.
The questions of passage 3 were originally Nos. 1, 4, 5, 6 and 9.

TABLE 8

The Passages and Questions Chosen for the Final Test

SCIENCE GROUP

No. of Passages	No. of Correct Responses to Questions **							
	1	2	3	4	5	Total	Mean	Percent
1*	19	19	19	20	20	97	4.85	97.00
2*	20	18	19	19	20	96	4.80	96.00
3*	19	20	18	19	20	96	4.80	96.00

* They were originally numbers 1, 2 and 3. See Appendices 2 and 3.

** The questions of selection 1 were originally Nos. 1, 3, 5, 6 and 8.
The questions of selection 2 were originally Nos. 3, 4, 5, 6 and 8.
The questions of selection 3 were originally Nos. 1, 2, 3, 6, and 7.

TABLE 9

The Passages and Questions Chosen for the Final Test

ARTS GROUP

No. of Passages	No. of Correct Responses to Questions**							
	1	2	3	4	5	Total	Mean	Percent
1*	19	18	19	20	19	95	4.75	95.00
2*	18	20	19	20	19	96	4.80	96.00
3*	18	19	19	20	20	96	4.80	96.00

* They were originally Nos. 1, 2 and 3. See Appendices 2 and 3.

** The questions on passage 1 were originally Nos. 1, 2, 5, 6 and 8.
The questions on passage 2 were originally Nos. 2, 5, 6, 7 and 8.
The questions on passage 3 were originally Nos. 1, 2, 3, 4, and 6.

TABLE 10

The Passages and Questions Chosen for the Final Test

SOCIAL STUDIES GROUP

No. of Passages	No. of Correct Responses to Questions **							
	1	2	3	4	5	Total	Mean	Percent
1*	18	19	19	19	20	95	4.75	95.00
2*	20	20	20	20	20	100	5.00	100.00
3*	19	20	18	20	20	97	4.85	97.00

* They were originally Nos. 1, 2, and 4. See Appendices 2 and 3.

** The questions on passage 1 were originally Nos. 3, 5, 6, 7 and 8.
The questions on passage 2 were originally Nos. 2, 3, 4, 5 and 7.
The questions on passage 3 were originally Nos. 2, 3, 4, 5 and 6.

majority of the students cannot be considered clear, fair, or meaningful for the Iraqi students who have hardly any proper training in reading. They were victims of the retarding process of reading aloud round the class. The Iraqi students' progress in reading, if they did progress, is done mainly by the students' own effort and reasoning, through trial and error. They had to understand what they read in different subjects to pass their exams. The English process of learning to read, on the contrary, is done through planned methods which are intended "to improve upon nature by concentrating into a few hours a week the essence of what takes a whole lifetime from our students. With the cultivation of knowledge in their brain...."[1]

Consequently, three passages out of five were selected on the basis that they received higher percentages of correct responses than the rest. The items on each passage were chosen on the ground that 90% or more of the responses they received were correct. If it happened that two tiems had the same percentage of correct responses, the item thought to be testing a skill that was different from what had already been chosen, was selected. As has already been pointed out, these tests were mastery tests, items which were testing skills that should have been mastered, and items which were testing skills that might not have been mastered, were selected.

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1. Gatenby, E.V., E.L.T. Selection, No.1, 1967, p.2.

According to Lindquist,[1] the tryout stages are three: 1) the pre-tryout; 2) the tryout proper; and 3) the final tryout administration. In this chapter the first two tryouts are dealt with. In the next chapter the trial administration will be explained and fully discussed.

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1. 1951, p.251.

CHAPTER VI

THE ADMINISTRATION AND SCORING OF THE TESTS

"Valid results depend upon accurate administration and scoring." [1]

This chapter deals with the last stage of the tryouts, mentioned in the previous chapter, the trial administration. As has already been seen the instructions were clear and meaningful, the class situation, when administering the test, was satisfactory, and the items which showed satisfactory responses were selected; the tests then were ready to administer to the students of Baghdad University.[2]

Planning and Trial Administration

Sampling: The first problem that faces a test constructor is sampling. He should try not only to obtain representative samples in order to avoid bias in his data, but he should also try to draw samples that yield maximum information possible about the population from which the samples were drawn.

In the present investigation three types of sampling problems were to be solved. The first was to determine the university in which the investigation was to be carried out. The choice was the University of Baghdad. The other two iraqi universities, the University of Mosul and the University of Basrah, were only very recently established,[3] at the time the investigation was to be carried

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1. Traxler, in Lindquist, 1951, p.329.
2. For a model of the finished tests see Appendix 3.
3. The Universities of Mosul and Basrah were established in April 1967.

out. Enough information about them, then, was not available. They were colleges before April 1967. Anyway, even if they were established long enough that it would be feasible for an investigation to be carried out, Baghdad University would be selected for the present purpose. The population of these universities would mostly be regional students, while the population of the University of Baghdad represents all the Iraqi educated people.

The second was to select a representative sample of the university institutions. Eighteen colleges and six institutes are affiliated to the University of Baghdad. Eight of the colleges and four of the institutes belong to the faculty of science. Each of the faculties of Arts and Social Studies consist of five colleges and an institute.[1] The samples were to be drawn from the colleges of the university only, since the institutes' population was thought to be educationally below the standard of the English controlled groups. Seven colleges were selected altogether, three from the faculty of Science, and two from each of the faculties of Arts and Social Studies. Each sample represents one third of the colleges in each faculty. This was thought to be a reasonable proportion for the purpose at hand.

The third sampling problem to be solved was how to obtain representative samples of students within each selected college, and each year of the four-year university course. All the college courses are of four years' duration,

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1. The information obtained from the University of Baghdad catalogue, 1967-1968.

with the exception of the college of Medicine and Engineering whose courses are six years and five years respectively. It was decided that the samples should be drawn from the first-year and the fourth-year students only, since the results of these two years would be enough to put readers in the full picture of the reading situation throughout the university course.

Selections had to be made. And a selection of 574 students, from seven colleges chosen to provide a good cross-section of the population, was made. A sample of 286 students was drawn from the first-year population; and a sample of 288 subjects was drawn from the fourth-year population. Each sample was divided into several sub-divisions, each of which was drawn from either a college or a department in a college. Each of the sub-divisions, in its turn, was divided into two halves. One half was to take the English version of the test; and the other half was to take the Arabic version of the test. The table below shows the distribution of the colleges and the students.

Particular care was taken to ensure: 1) that the samples were truly representative of the populations chosen from; 2) the halves within each sample were equally matched. And every effort was made to have a large enough sample so that the obtained results should not deviate much from the original populations and hence be reliable. Although common sense tells us that the greater the number of cases, the more reliable the analysis of results will be, yet, a sample bigger than 600 subjects was beyond the capacity of

TABLE 1

Distribution of Colleges and Students

Colleges 7		Medicine	Engineering	Sciences		Arts	Educa.	Econo.	Comm.	Total of Students
Depts.		-	-	Chem.	Phys.	Eng.	Eng.	-	-	574
Number of Students	First Yr. Students									
	Eng.	23	18	23		13	22	22	22	143
	Arab.	23	18	23		13	22	22	22	143
	Total	46	36	46		26	44	44	44	286
	Fourth Yr. Students									
	Eng.	20	18	12		21	14	16	21	21	144
	Arab.	20	18	12		21	14	16	21	21	144
	Total	40	36	24		42	28	32	42	42	288

the present investigation. The real problems were the questions of time and place. The colleges' authorities were not ready to 'waste' more than an hour of the students' time; and it was not feasible to test more than 50 students at a time without seating them next to each other, a situation which encourages attempts to copy, chaos, confusion and hence waste of time and violation of the planned rules of the tests.

It was thought possible that an investigator might unintentionally pick an undue number of clever or poor students in a small sample. As our samples were not large, it was decided to avoid such a mistake by stratifying the students according to their academic marks and drawing proportionately a number at random from each stratum. In this study, stratified-random sampling was used as a device to get a sample representative of the whole student population; the purpose of stratified sampling in matched research is rather different.

The investigator had been given access to the colleges and the departments of the university after spending a month going through a chain of routine procedures. An introductory letter from the missionary office in Baghdad was sent with an application form to the university. When the access was granted, application forms for access to the registration office and to some of the departments were made to the deans of the colleges concerned.

This being settled, the investigator could go through the registry records

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1. Butcher, H.J., 1966, p.8.

of the students in each college and select her informants. According to the plan arranged beforehand, she divided the students into groups with regard to their academic marks. The first group consisted of those whose marks were in the nineties; the second group's marks were in the eighties; the third, fourth and fifth groups' marks were in the seventies, sixties and fifties respectively. Random numbers, in proportion to the population of each group, were drawn, and lists of the names and marks were prepared. Groups of students were, then, matched and selected. The matched groups were controlled according to their academic marks, home towns, sex, and social backgrounds. One of the groups was to take the English version of the test, and the other was to take the Arabic version. In short, the sampling was planned in a way as to arrive at results which could be true for the members of the two halves of the students (the Arabic and the English) in particular and for all the students at Baghdad University in general.

While these formalities were going on, the Arabic version of the tests, which were translated by the writer, were given, by a special arrangement, to specialists in the subject fields of the reading material, and to authorities in the Arabic language to be checked. The checking was to be carried out in respect of translation, its accuracy, and its wording, form, and style. The test devised for the first-year students was checked and approved of by Dr. Safa Kuloucy,[1] an authority in the field of translating English literature - poetry and

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1. Ph.D. in Arabic Literature, School of Oriental Studies, London, 1947.

prose - to Arabic. The fourth-year tests were checked twice. Once by specialists in the field, and a second time by a specialist in the Arabic language. Dr. Faraj A. B. Haba approved of the translation of the content of the Science group test.[1] Since Jibran's "The Prophet" had already been translated by many Arab writers, Dr. Tharwat Akasha's translation was used for the Arts group test. The Social Studies test translation was discussed with a Ph. D. student in law at the U. C.[2] The language of the Science material, with the Social Studies material, were approved of by Mr. J. Al-Khalili, a well-known Iraqi novelist and an authority on Arabic language. The material of the reading speed test was translated to English by the B. B. C. This material was obtained through Mr. S. Al-Khadhem, who worked as a translator for some time for the B. B. C. Consequently, the test was given in the second half of the year. As the students were busy preparing for the University examinations, it was impossibly to apply the test at the end of the academic year. This was thought to be the maximum requirement to make sure that the first-year students were first-year students and the fourth-year students were fourth-year students.

Preparing for the Administration of the Test

Being checked and approved of, the tests were typed on stencils and run off. Enough copies, and some extras, of each were obtained. Each individual

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1. Ph. D. in Chemistry, Imperial College, London, 1966. Ph. D. in Chemistry, Queen's University of Belfast, 1963.
2. Mr. S. Al-Khadhem, who will be a Dr. of Law by the time this work is finished.

test, which consists of twelve pages, was pinned in the form of a booklet ready for use. The first page of the test booklet was for the student to write his/her name, college, and department on. The remaining eleven pages were made up of selections for reading,questions on the selections, and the answer sheets. The students were not provided with written instructions. The instructions were recorded for two reasons. First, because a well known source of error in test administration is giving either too much or too little instruction and explanation to one group and not to another. Secondly, the Iraqi students were considered to be very slow readers and oral instructions would save time. The instruction for each group was recorded on a separate tape. As a guarantee that the students should not be penalized through lack of familiarity with the method of testing, practice examples with answers were recorded on each tape after the instructions.

Some other sources of errors in test administrations are: 1) Probably the greatest source of error is incorrect timing of tests that involve a time limit. 2) Failure to make clear to pupils what they are expected to do about guessing. These were stated clearly in the recorded instructions. 3) Variation in the physical conditions under which tests are administered. 4) Failure to control opportunities for chance or purposeful copying. 5) Putting undue stress on motivation.

Arrangements were made with the authorities in the colleges to assign a certain hour of the day for testing all the first-year students; and to allot a

special hour for each group of the fourth-year students. The rooms for each group of students were chosen to be quiet and suitable in every respect for tests to be carried out. In doing this, all the distracting influences for all the groups were controlled and the students' comfort was ensured. The chairs were of the same kind for all the students who were to be compared. They were arranged in such a way as to give enough space between one chair and another to render copying impossible, and help the students to feel at ease.

A week before the actual test took place, the investigator visited the common rooms of the colleges concerned and was introduced to the students. She had friendly talks with the students, in the course of which she explained the purpose behind the tests and the invesgitation, to make them relax. Research[1] has proved that students do better at tests and examinations when they feel at ease and relaxed. Valusak revealed that anxiety or any state of nerve uneasiness has a bad effect on the quantity and quality of reading. He gave an oral test to two equal groups; one of the groups had been given tranquillizers an hour before the test. The group who had had the tranquillizers did much better than the other group. At the same time the students were assured that the results of these tests had nothing to do with their university records, and

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1. Valusek, J.E., in: Cousey, O.S., 1960, pp.42-46.

that no names would be mentioned and all the individual results would be treated as confidential. By doing this, the investigator believed that she could put the students, who are inquisitive by nature, at ease and give them some sort of motivation to take the tests. The students showed great understanding and co-operation. They were aware of their reading problems; and were keen to improve their reading skills, especially that of speed.

The Actual Administration of the Test

> "The realization of the potential values of educational measurement depends largely upon the understanding, accuracy, and competence with which tests are administered...." 1

Since the comparison between the norms of the standardized tests, and the norms obtained from the proper administration of the tests is valid only when exactly the same procedure is followed in both cases, the investigator took upon herself the responsibility of administering the tests according to the contrived plan with utmost precision.

The second hour of the day was assigned to testing all the first-year students; that means that every college alloted the second hour on the time-table to the testing of their first year students. The fourth hour of the time-table of each college was ascribed to testing the fourth-year students. The investigator made sure to be in the class ten minutes before the time for the test

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1. Traxler, A.E., in: Lindquist, E.F., 1951, p.329.

to start, i.e. during the students' break after the first hour. In these ten minutes she managed to distribute the test pamphlets onthe desks, upside down, forming one row English and one row Arabic, ready for the students to use. The tape recorder, by means of which the instructions were to be given, was prepared. The instructions were given in the mother tongue, Arabic, because: 1) To save time, as it would take the students more time to absorb spoken English than spoken Arabic. 2) To guard against ambiguity which might arise from the instructions being given in English. Though some of the students might not find any difficulty in getting messages through spoken English, others might. Hence, the giving of instructions in Arabic gave an equal chance to all to understand the instructions. Otherwise, one would not know whether a student had done poorly because of lack of ability in reading or because of inability to understand the instructions.

As soon as the students took their places on the pre-numbered chairs according to the prepared lists of the names and numbers of the students, some short introductory sentences were given to prepare the students for the test. These opening sentences were as follows: "We all know what this test is about. Let us relax and try our best. Listen carefully to the instructions you hear on the tape. To be able to answer the questions, it is essential to understand the instructions. When the tape stops, wait for further instructions."

The tape was accompanied by necessary illustrations put on the black-

board beforehand to clarify the oral instruction. The time alloted to the giving of the instructions was ten minutes; 5 for the speed test and 5 for the comprehension test.

When the instructions were given, and the tape had stopped, the students were asked if they had any questions to ask. When the questions, which were few and rare, were answered, the investigator asked the students to turn their booklet over. Watching her handwatch, which had a second hand, she would say: "Start reading". To be exact in timing the students, a few seconds were allowed for the students to start reading after hearing the word "start". A minute after starting reading, she called out "stop, Arabic readers only". After two minutes had passed, she said in an audible voice, "stop everyone". After the speed test has finished the instructions for the comprehension test were given.

The supervision and the administration of the tests were successful. The students' reactions to the instructions were quite satisfactory. Hence, the act of testing went smoothly as was expected. The test booklets were collected for scoring. All the papers were checked against the list of the selected names to see if the right person had the right number or had taken the right version of the test.

Scoring of the Tests

In view of the crucial importance of scoring in the usefulness of the results, every measure was taken to secure uniformity and accuracy. The

procedures followed in scoring the answer sheets of the standardized tests were strictly followed in scoring the final administration of the tests in order to avoid error which might have impaired the scores. Since "The principal considerations in selecting and application of scoring procedures are accuracy, speed and economy",[1] the scoring scheme, summarised in the following tables, was adopted.

Tables 2A and 2B show the distribution of marks per test and portions of the test; Tables 3 and 4 provide diagrams illustrating the distribution of words within each selection and within selections and portions of selections combined.

Since comprehension is thought, at all times, to be the most important factor in the reading process, 60% of the marks were assigned to the test of comprehension. Being mastery tests, the test items were given equal values. The fact that some items demanded 'higher thought processes' was not taken into consideration on the ground that the tests' intention was not to evaluate items so much as to find out which skills were acquired.

The major proportion of the speed test (60%) was alloted to recognition, because without some check on comprehension there is no evidence that the actual act of reading has taken place. Without comprehension, then, silent reading could be nothing more than eye-movements over the page. Moreover,

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1. Anastasi, A., 1954, p.64.

"a reading speed without a reasonable level of comprehension (70%) has no validity", [1] at all.

A special scheme was followed in scoring the speed test. Although the number of words differs from one selection to another, equal marks were given to all selections. As it was impossible to give a mark or a portion of a mark to each word, and as the major aim was comprehension, and each selection was a thought unit, the present distribution of marks was thought to be justifiable.

Since the time for the speed test (2 mins.) was double the Arabic speed time, the English system of scoring was adjusted to make the English and the Arabic scores equal. The 276 words were divided by 2. The result (138 words) equalled 5 selections. Then the 5 was multiplied by 2 (the unit of the speed score) to obtain the total score for the speed test. The fact that 138 words = five selections was arrived at by the following ratio:

	Words	Selection
Arabic	222	8
English	138	?

In the same way, all the other values of the amount of the reading different individuals achieved were found. The following are the figures which were adjusted in the present investigation to denote one minute effort:

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1. Bayley, Harry, 1957, p.22.

276	=	5 selec. x 2	= =	10 the score
243	=	4.5 selec. x 2	=	9 " "
211	=	4 selec. x 2	=	8 " "
187	=	3.5 selec. x 2	=	7 " "
163	=	3 selec. x 2	=	6 " "
128	=	2.5 selec. x 2	=	5 " "
95	=	2 selec. x 2	=	4 " "

Hence some of the selections were scored indivisible. Others were sub divided for scoring purposes. Following the plan illustrated in Tables 3 and 4, two marks were given to each selection; one mark to a half of a selection; and half a mark to one-fourth of a selection. To the very few extra words read, no marks were given. To read two or three words of a selection was not enough to give any clue for comprehension. Since comprehension was reported in proportion to what was read, it was thought necessary not to give marks to the words which did not help comprehension. Though a very small amount of reading done was ignored in the process of marking, it was given due attention to the process of counting words to report the number of words read per minute. To facilitate accuracy in scoring, a note accompanied the scoring key stating that:

Those who read	4	single	out	5, 17, 9, 18.
" " "	5	"	"	5, 17, 9, 18, 10
" " "	6	"	"	5, 17, 9, 18, 10, 2
" " "	7	"	"	5, 17, 9, 18, 10, 2, 14
" " "	8	"	"	5, 17, 9, 18, 10, 2, 14, 24.

TABLE 2A

Scheme of Scoring

	No. of Selec.	Mark per Sel. & portion of Sel.	Full Mark	Time Per Minute English	Time Per Minute Arabic
Speed	8	2, 1, ½	16	2	1
Recognition	8	3	24	2	2
Total	16	5	40	4	3

	No. of Passages	No. of Ques. per Passage	Mark Per Passage	Mark per Question
Comprehension	3	5	20	4
	Full Mark	60		
	Time	Not limited		

Total Speed + Comprehension
100

TABLE 2B

The Comprehension Scheme of Scoring of Test Standardization

	No. of passages	No. of items per passage	Marks per Item	Marks per passage	Total
First Year	5	10	4	40	200
Fourth Year Science	5	Passages 1,3 & 5 each = 8 Passages 2 & 4 each = 9	4	Passages 1,3 & 5 = 32 Passages 2 & 4 = 36	168
Fourth Arts	5	Passage 1 = 10 Passages 2,3 & 4 = 8 Passage 5 = 6	4	Passage 1 = 40 Passages 2,3 & 4 = 32 Passage 5 = 24	160
Fourth Social Studies	5	8	4	32	160

TABLE 3

Distribution of Words in the English Speed Test

	Number of Selections								
	1	2	3	4	5	6	7	8	Total
No. of words in the Selections and Portions of the Selections	16	20	23	36	33	35	48	65	276
		36							
			48	59					
				68	77	87	95		
					104	112	120	128	
					137	146	154	163	
					175	187	199	211	
					227	243	250	276	

TABLE 4

Distribution of Words in the Arabic Speed Test

	Number of Selections								
	1	2	3	4	5	6	7	8	Total
No. of words	15	14	12	21	29	35	37	59	222
in									
the Selections		29							
and			41						
Portions of				52	62				
the Selections				77	91				
						109	126		
						144	154	163	
						192	199	222	

Though the students were told not to single out more choices than the selections they read, the scorer was instructed to consult the figures given above and give no mark to those which are not within the students' scope of reading. The students were also told that they would be penalized for guessing. Thus, it was believed that they had; most probably, avoided it.

For scoring the recognition part of the speed test, a scoring key was prepared. It was made of a sheet of cardboard, the same size as the answer sheet. At each place where the correct mark should appear on the answer sheet, a hole was punched in the cardboard. The holes were exactly the same size as the spaces provided on the answer sheet where a cross, indicating the right answer, must appear.

To score the comprehension part of the test, a model answer sheet was prepared. The scoring was done by comparing the students' answers to the model answers provided. The scorer was instructed to accept any word in the students' answers which was a synonym to the word found in the model answer.[1] When the tests were standardized quite a few synonyms were found in the English informant answers. This was certainly due to their wide vocabulary. The Iraqi students' answers, on the contrary, were nearly identical. Hardly any synonyms to the model answers appeared in their answers. The scoring of the results by hand would apparently justify the acceptance of synonyms, in the students' answers, to those of the model answer.

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1. Model answer sheets are attached to Appendices 2 & 3.

Since most of the answers in the comprehension part of the test were to be provided by the testees; and since four alternatives were provided in those few cases where multiple-choice items were used, the correction for guessing was justifiably neglected.

To have the raw scores of the students ready for statistical usages, they were entered on an individual cumulative record. In the next chapter, detailed explanation of each statistical procedure is given, and illustrative tables and diagrams are provided to report, analyse, and interpret the results.

PART THREE

RESULTS OF MEASUREMENTS

"The Age of Statistics is upon us. Almost every aspect of natural phenomena and of human and other activity is now subjected to measurement in terms of statistics...."

(Reichmann, W.J., 1964, p.11)

CHAPTER VII

REPORTING, ANALYSING, AND INTERPRETING THE RESULTS OF TESTS

> "Very few people nowadays can progress very far without at some point coming into contact with statistics." 1

The Experimental Design and Sampling Problems

This is the third phase of the present investigation, undertaken to test the hypotheses stated in Chapter III.

It may be recalled that the main hypothesis was that the reading skills and habits of foreign language learners (of English, in this case) may be affected to a certain extent by the reading abilities and habits of their mother tongue (in the present case, Arabic).

For this purpose, four reading tests, each of which consisted of a speed-recognition test and a comprehension test, were constructed and given to the first and fourth-year students at the University of Baghdad. Each of the tests, in addition, was composed of two parallel forms; one in English and the other in Arabic. The parallel forms were given to two samples of students, selected to be as identical as possible, within each group; i.e. within each faculty of the first-year and the fourth-year students.[2]

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1. Reichmann, W.J., 1964, Preface.
2. See sampling, p.145, for question of identicality of English and Arabic groups.

The answer sheets were scored by the investigator according to the manual of instructions. Adding of the scores was done after all the items had been marked to ensure accuracy. Later, systematic checking of the scoring was also carried out. The first and fourth years, and the English and Arabic group's results were treated separately. To ensure uniformity and precision of interpretation of the scores made on the two forms, the statistical procedures adopted were the same. In the following discussion "test scores" means total scores on English and Arabic versions of the test, assuming for the time being that totalling is justified in a point to be taken up later.

Before proceeding to report and analyse the results, it is necessary to prove how justifiable it was to combine all first-year students into one group and the fourth-year students into three groups according to their field of study and the test they were given. Thus, analysis of variance and "t" tests were applied to test differences of test scores between groups. As a result, the first-year students were divided into five sub-groups on the English test only. The difference between Medicine on the one hand and Engineering and Sciences on the other was significant at 0.01 level - while the difference between Arts and Education was at 0.05 level. There was no significant difference between the College of Commerce and the College of Economics (later combined as the Social Studies group).

The fourth-year students were also divided into five groups; one group

Social Studies, two groups Sciences, and two groups Arts. There was no significant difference between the Arts group and the Education group on the English test, while on the Arabic test the difference was significant at 0.05 level. Though there was no significant difference between Medicine and Engineering, the difference between them and the Science group was at 0.01. level. Between the Colleges of Economics and Commerce there was no significant difference on either test, English or Arabic. Yet the result of analysis of variance proved how highly selective were the students within each group. It also confirmed the discriminatory function of the Iraqi examinations and educational system. One might venture here to say that the reading tests could have been used to fulfil the same selection function as the Iraqi examinations. This is later confirmed by showing a significant correlation between the two types of tests.

The individual raw scores for each sub-group were plotted in the form of frequency distributions, and examined for normality. Unfortunately, the sub-groups were found to be too homogeneous to allow an assumption of normality to be made. The lack of normality would have rendered interpretation of the results of subsequent calculations difficult in the inferential sense. Moreover, the numbers in some of the sub-groups are small, a fact which again inhibits reliable statistical conclusions in certain methods of analysis. Lack of normality particularly affects conclusions about correlations,

and normality is desirable for 'T' tests and 'F' tests. Large samples are desirable for reliable deductions from multi-variet processes, including factor analysis which is to be used later.

As the aim of the investigation was to ensure meaningful results and to reduce labour, it was considered desirable to combine groups into as few categories as possible without losing data on differences possibly significant enough to bias the ultimate testing of the hypothesis. Vernon[1] believes that too much homogeneity is as bad as, if not worse than, heterogeneity. He states:

> "It is not easy to decide just what degree of heterogeneity should be regarded as normal and reasonable, nor to specify the extent any given group of persons exceed or fall short of this degree of heterogeneity." 2

He suggests that the combination of heterogeneous groups depends on the purpose of investigation. Heterogeneity of groups was permissible for certain purposes. Accordingly, the raw scores of the combined groups - one first-year's and three fourth-year's - were distributed in order to examine their normality. The result, though skewed, was much more satisfactory, as far as normality was concerned, than the distribution of the sub-groups.[3] This is so because the students were highly selected. According to the Iraqi educational system, the best students

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1. Vernon, P.E., 1940, p.140.
2. Ibid.
3. See Tables 6, 7 and 8 for first-years; Tables 10, 11 and 12 for fourth-years.

of the scientific branch go to the College of Medicine; the second best go to the College of Engineering; the third best go to the College of Sciences, and those left, according to their interests, go to the Colleges of Education, Economics and Commerce. The best students of the Arts branch go to the English Departments of the Colleges of Arts and Education, and the residuals go either to the other departments of these same colleges or to the Colleges of Economics and Commerce, except in the rare case when some of the good students are interested in the last two colleges. Retention of separate groups can tend to aggravate non-normality by working with different zones of the same normal curve.

The homogeneity or heterogeneity considered in Vernon's writings is, however, not to be confused with that arising from an educational situation in which heterogeneity is induced or aggravated by the curriculum in different institutions. He is, in fact, discussing consequences of selection of groups representing different zones of a normal distribution, and we may be concerned in this situation with the other kind of heterogeneity in the fourth-year students. Our problem is, in fact, to decide for fourth years whether we wish to discuss differential effects of the educational climates of the different faculties on the relationship between reading skills in different languages, that is whether we are interested in the "fourth-year students" or in the "specialized fourth-year student".

The best compromise seemed to be to combine groups to give larger numbers and more nearly normal distributions of the test variables as far as possible, while preserving essential intrinsic differences.

Accordingly, it was decided to combine all first-year sub-groups, who took the same test, into one group; and the fourth-year sub-groups, who had three different comprehension tests, into three groups as stated in Chapter IV. The inferences which will subsequently be made are assumed to apply to the student within these sub-groups and to be suitable for generalization to other groups similarly selected and under the same educational influences.

Preliminary Analysis of Results

As a first step in the reporting and analysing of the tests' results, the means and standard deviations of the raw scores for each group on the major parts of the test, speed, recognition, comprehension, and on the test as a whole, were computed - by the Computer Unit, Institute of Computer Science, University of London - and tabulated in the following pages.

Tables 1 and 1A show the means and standard deviations of first-year students on the speed, recognition, and comprehension tests, and all combined in one, in Arabic and English.

Table 2 is again a summary of the means and standard deviations of the fourth-year Science, Arts, and Social Studies groups on the three parts of the test, and of the reading test as a whole. Table 2A shows the means and

Standard Deviations of the College of Medicine and the College of Engineering.

Differences between Reading Ability in Arabic and English

The assessments of such differences presents a statistical problem because we have not a prior justification for considering the test marks in these two areas to be on the same dimension. However, statistics will be presented on the grounds that the constructs involved in the tests and the scales of units used are basically similar. The high correlation between the two forms of test to be presented later (see pp.230-41) for matched results of the subjects involved is taken as an empirical justification of this assumption. Correlation, however, demonstrates similarity of rank order and not equality of scale positioning of the measures correlated, and it is still possible for the ability required by one form of test to be shown to be consistently higher than that represented by the other. Demonstration of this fact requires a test of significance of difference of means.

The question of the appropriate formula to be used for such a test can only be decided on a basis of how appropriately the subjects have been matched in the first place. If they are well matched the formula

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2 + \sigma_2 - 2r\sigma_{1\ 2}}{n}}}$$

r = correlation between alternative forms

is appropriate and if they are not matched and r is not significant then we must delete the term containing r in this formula. Deletion of r takes a conservative view insofar as it reduces the value of t and tends to make the conclusions less significant than they otherwise would have been. We therefore used the formula

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma 1^2}{N_1} + \frac{\sigma 2^2}{N_2}}}$$

Where:

M_1 and M_2 = Means of Arabic group and means of English group

σ_1 and σ_2 = Standard deviation of the two groups

and

N_1 and N_2 = Number of cases in the two groups

The denominator of the formula stands for the S.E. of the difference between the means.

and accepted that significant results will remain significant on the other formula.

Tables 1 and 1A reveal the English-Arabic difference on speed test, recognition test, comprehension test and all combined in one, and state the

results of the significant test obtained by consulting tables of "t". Since the rate of reading Arabic was nearly twice the rate of reading English, it was perfectly evident that the difference between the two rates was significant, and thus "t" test was not applied. The result of applying "t" to the tests of recognition, comprehension and the total (the reading test as a whole) is shown in Tables 1, 1A, 2 and 2A. The result of the first-year students as one group is shown in Table 1. In Table 1A, the results of two able sub-groups, of the whole first-year group, are presented. And the results of the three groups of the fourth-year students are exhibited in Table 2, while in Table 2A the result of the group consisting of Medicine and Engineering is shown.

From Tables 1 and 2 it is evident that there is a considerable difference between the rate of reading in Arabic and the rate of reading in English. Both the first-year students and the fourth-year students read in Arabic twice as fast as they did in English. If we turn to Tables 3 and 4, where the mean scores of the best and the weakest students are shown, it will be seen that the tendency to read significantly faster in Arabic than in English is also prominently exhibited by those groups.

The great difference in the means and standard deviations of the speed tests in Arabic and in English demands some explanation. Why do Iraqi University students read faster in Arabic than in English?

One of the many possible answers, perhaps the most essential, to this question lies in the structural nature of the Arabic language itself. Arabic, as far as sound and structure are concerned, encourages its readers to give attention to words instead of phrases, as is the case in reading English, as reading units. This is so because "Arabic is an inflectional, synthetic language which employs for the conjugation of the verb and the declension of the noun formal devices to indicate mood, aspect, person, gender, number, and case, devices which at first glance appear to be suffixes in the main part."[1] These structural points are not to be discussed in detail here. Only the devices that explain the assumption that Arabic encourages word-by-word reading are to be discussed briefly. Internal vocalic-change, a device that makes Arabic words short and consequently recognizable by narrow eye-span readers, is the fundamental grammatical process in the literary Arabic verb. Prefixes, infixes, and suffixes are the main features of Arabic syntax. Hence, a clear-cut dividing line between morphology and syntax does not always exist in written Arabic. An Arabic form which is printed as one word, is found upon analysis to be a sentence. The following are only a few examples:

'Kataba', 'Kattaba', 'Inkataba', and 'Takataba'.

Kataba, the first word (or rather sentence), which means 'he wrote', is a two-words sentence in English; while 'Kattaba', with the addition of only a 't'

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1. Bulos, A.A., 1965, p.3.

as an infix, comes to mean "he made somebody write", which obviously is a four-words sentence in English. 'Inkataba' and 'takataba', the third and fourth forms, mean "it got written", and "they corresponded with each other", respectively. The corresponding English meaning to the last form is a five-words sentence. This might be the direct cause of Iraqi readers dealing with word units and having narrow eye-spans. Apprently, this habit of reading in Arabic was carried over to reading in English, causing a very slow reading process. As we know the ultimate goal of reading is to secure meaning from the printed page in thought units. Therefore, the size of the recognition span is a very important element in reading English, while it is not so in Arabic, where words are usually the carrier of thought units. As a result of narrow eye-spans English comprehension might suffer. For this reason, the quality of reading, regardless of rate of reading, becomes the most important reading factor in this investigation.

Another outstanding characteristic of an Arabic word is that it is pronounced in nearly the same way as it is written. Arabic, in this respect, could be regarded as a phonetic language. And especially so, when it is compared to the English language. Here comes in the difficulty that we all know English spelling causes its readers, whether foreigners or English speakers. This difficulty is brought into the limelight by those researchers whose aim is to make English into a phonetic language by one means or another. 'The Initial

Teaching Alphabet', originally orientated by Sir James Pitman, was used by Downing, in a reading research experiment started in England in 1961, to teach children to read better and faster. The 'English Words Colour' is another method of making the teaching of reading easier by turning English into a phonetic language. Each colour is used to indicate a sound and different colours are used for the same sign when it sounds differently.[1]

An Iraqi reader of English is slow because he needs to increase the duration of his eye-fixations to form a right association between sounds and shapes of words by eliminating all the extra letters which are not to be pronounced, by him who is used to pronouncing each letter in a word in his own language, in an English word. In doing this, he tries to get clear perceptions of the meaning of the words he reads. Having to deal with the "English spelling, well-known for its irregularity",[2] after being used to a relatively regular Arabic spelling, the Iraqi reader of English is bound to read slowly. G.T. Buswell states in his research (1922) that even English readers, who have already formed a wide eye-span habit, cannot apply their habit adequately to the reading of a foreign language:

> "... when a pupil is given a text in algebra or foreign language his previous habit of using a wide recognition unit with simple story material is entirely inadequate for the mastery of this new content." 3

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1. Lee, T., 1965-1966.
2. Lee, W.R., 1960, p.3.
3. Fundamental Reading Habits: A Study of Their Development, supplementary Educational Monograph, No.21, p.29.

In the light of Buswell's argument, the Iraqi process of reading slowly in English can be both explained and excused; but the difficulty arises when an attempt is made to explain his being slow in reading Arabic. The method which is the very old way of reading aloud round the class, and the short period of teaching reading, which does not exceed the intermediate school, is to be blamed.

To mark the difference between the mean scores of the Iraqi students' achievement in recognising general ideas read in English and those read in Arabic, a second survey of Tables 1, 1A, 2 and 2A is necessary.

A difference, significant at 0.01 level, between the first-year group - combining all the sub-groups into one - reading in English and its matched Arabic group - equivalent in number - is shown in Table 1. Table 1A reveals an important evidence of the absence of significant differences between recognition in Arabic and recognition in English among able students. Analysis of the first sub-group students' academic marks singles out the College of Medicine as the best among the Science branch and the College of Arts as the best among the Arts branch. A possible explanation for the absence of difference between recognition in Arabic and recognition in English among able students and the existence of significant difference among the less able students, is that the Arabic-English difference in recognition is attributed chiefly to difference with respect to the students'capacity and not to the field

of study where English is or is not a medium of instruction. Moreover, the influence of English as a medium of instruction cannot possibly be so great over students having only two months of coaching in English.

Tables 2 and 2A give a similar result to that of the first-year group for the fourth-year groups - namely, the absence of significant differences between the mean scores of recognition in Arabic and recognition in English among able students, and the presence of significant differences between the mean scores of English recognition and Arabic recognition among the less able students.

A further examination of the tables mentioned above demonstrates an evident fact concerning the differences between comprehension of material read in Arabic and the comprehension of material read in English.

A significant difference between the mean scores of the Arabic comprehension of all first-years - as one big group - and the mean scores of their English comprehension is clearly tabulated on page 177. Table 1A shows the Arts group as an exception. There is no significant difference between the comprehension ability of the Arts students' reading in Arabic and their reading in English. This does not mean that the Arts students are more able than the Science students. Reference to the nature of the course of study of the Science group might explain the reason for the Science students' comprehending better what is read in Arabic than what is read in English in this particular situation. With the exception of the English subject, whose material is literary, all the

science subjects' material is scientific. Being interested in science, the students care only very little for literature. And this is strongly so, when they know on entering the university that they have nothing to do with literary material. They therefore read and studied "Silas Marner" only to pass their examination. They also chose the easiest way to study the book for passing the examination. And that easiest way of studying the book is through Arabic. Most of these students read and studied the Arabic translation of the book. Naturally, one would react in a better way to material read in the language in which one originally studied that material than in another language, no matter how competent one is in the other language.

The fourth-year tendency to comprehend in English as well as to comprehend in Arabic is revealed in Tables 2 and 2A. One of the fourth-year groups, which is made up of the College of Medicine plus the College of Engineering, is even slightly - though not significantly - better in comprehending material read in English. The exceptional group in this respect is the "Social Studies". They comprehend material read in Arabic significantly better than those read in English. And this is expected from a group whose general educational aptitude comes at the end of the Iraqi Government educational measuring scale.

The significant difference between the mean scores of the test as a whole in Arabic and the mean scores of the test in English is due to the influence of

TABLE 1

Means and Standard Deviations of First-Year Students

Group	No. of students	Speed Mean	Speed S.D.	Recognition Mean	Recognition S.D.	Comprehension Mean	Comprehension S.D.	Total Mean	Total S.D.
English	143	7.19	2.14	11.39	5.43	37.52	13.30	56.42	17.21
Arabic	143	15.00	1.54	15.53	4.96	49.48	7.60	79.97	10.70
"t" Test	*	-		6.72		9.65		13.90	
Sig. Lev.		-		0.01		0.01		0.01	

* It is quite obvious that the difference between the two speeds is highly significant. There is no need for computing "t" test.

TABLE 1A

Means and Standard Deviation of First-Year Medicine and Arts on Recognition and Comprehension Tests

Groups	No. of students		Medicine				Arts			
			Recognition		Comprehension		Recognition		Comprehension	
	Med.	Arts	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
English	23	13	16.70	4.23	46.78	11.21	13.15	4.51	48.31	6.21
Arabic	23	13	17.35	4.04	54.09	4.33	13.38	5.56	51.69	5.53
t Test			.533		6.269		.166		1.467	
Sig. Lev.			None		0.01		None		None	

TABLE 2

Means and Standard Deviation of Fourth-year Students

Group	Sciences								No. of Students: 72								Arts								No. of Students: 30							
	Speed				Recognition				Comprehension				Total				Speed				Recognition				Comprehension				Total			
	Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.	
	16				24				60				100				16				24				60				100			
English	7.65		1.97		12.25		4.72		48.50		8.98		68.40		12.67		7.00		1.40		14.90		3.20		35.60		9.24		58.40		10.54	
Arabic	15.21		1.29		14.58		3.64		50.89		7.27		80.46		9.53		14.73		1.36		15.90		4.03		40.00		8.21		70.63		8.48	
t Test	*	-		-	3.33				1.76				6.48				*	-		-	1.06				1.95				4.73			
Sig. Lev.	-		-		0.01				None				0.01				*	-		-	None				None				0.01			

Group	Social Studies								No. of Students: 42							
	Speed				Recognition				Comprehension				Total			
	Mean		S.D.		Mean		S.D.		Mean		S.D.		Mean		S.D.	
	16				24				60				100			
English	6.85		2.40		10.21		5.22		18.38		9.48		35.45		8.29	
Arabic	15.48		1.09		14.14		4.09		38.86		8.89		68.24		8.07	
t Test	*	-		-	3.02				4.44				18.36			
Sig. Lev.	-		-		0.01				0.01				0.01			

* There is no need for computing "t" test since the difference between the two speeds is clearly highly significant; the rate of reading Arabic is twice the rate of reading English.

TABLE 2A

Means and Standard Deviations of Fourth-year Medicine & Engineering on Recognition, Comprehension & Total

Group	Recognition		Comprehension		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Arabic	14.84	3.88	51.89	7.05	81.58	10.28
English	14.05	3.56	52.53	7.39	74.52	8.79
't' test	.292		.383		3.243	
Sig. Lev.	None		None		0.01	
N	38		38		38	

TABLE 3

Means and Standard Deviations of First-year Groups Emerged from Analysis of Variance

College	No. of students	English								Arabic								Deg. Sig.	
		Speed		Recognition		Comprehension		Total		Speed		Recognition		Comprehension		Total		Eng.	Arabic
		Mean 16	S.D.	Mean 24	S.D.	Mean 60	S.D.	Mean 100	S.D.	Mean 16	S.D.	Mean 24	S.D.	Mean 60	S.D.	Mean 100	S.D.		
Medicine	23	8.39	1.83	16.70	4.23	46.78	11.21	71.87	15.26	15.43	1.08	17.35	4.04	54.09	4.33	86.87	6.76		
Eng. & Sciences	41	6.49	2.03	11.41	5.03	38.78	10.48	57.78	11.84	14.85	1.44	14.56	4.72	49.27	6.29	78.93	9.65	None	0.01
Arts	13	8.46	2.22	13.15	4.51	48.31	6.21	69.92	8.51	15.54	1.20	13.38	5.56	51.69	5.53	80.62	11.01		
Education	22	8.05	1.76	11.59	3.62	41.09	10.84	60.72	11.28	15.09	1.11	16.50	4.00	48.00	6.29	79.59	8.32	0.05	None
Social Studies	44	6.41	2.00	7.98	4.97	26.55	11.70	40.93	14.36	14.70	2.00	15.64	5.59	47.36	9.91	77.34	12.92	None	None

TABLE 4

Means and Standard Deviations of Fourth-year Groups Emerged from Analysis of Variance

Colleges	No. of students	English								Arabic								Deg. Sig.	
		Speed		Recognition		Comprehension		Total		Speed		Recognition		Comprehension		Total		Eng.	Arabic
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
		16		24		60		100		16		24		60		100			
Sciences Medicine & Eng.	38	7.95	1.86	14.05	3.56	52.53	7.39	74.52	8.79	15.26	1.15	14.84	3.88	51.89	7.05	81.58	10.28	0.01	None
	34	7.32	2.07	10.24	5.07	44.00	8.53	61.56	8.60	15.47	1.44	14.29	3.39	49.76	7.45	79.21	8.60		
Arts	14	7.92	1.73	15.00	3.33	37.43	7.62	60.36	10.90	15.07	0.83	16.93	4.17	42.57	6.77	74.57	9.39		
Education	16	7.88	1.09	14.81	3.19	34.00	10.43	56.68	10.24	14.44	1.67	15.00	3.79	37.75	8.88	67.19	8.38	None	0.05
Social Studies	42	6.85	1.40	10.21	3.20	18.38	9.24	35.45	10.54	15.48	1.09	14.14	4.09	38.86	8.06	68.24	8.89	None	None

the speed test, the rate of which, as it has already been stated, was much greater in Arabic than in English. The degrees of significance between the mean scores of the English and the Arabic version of the tests for the first- and fourth-year students are shown in Tables 1, 2 and 2A.

Frequency Distribution

The following tables, Tables 5 - 13, show the frequency distributions, means and standard deviations of the scores obtained by the first, and the fourth-year students on the speed, recognition and comprehension tests and on the tests as complete wholes.

Frequency distribution tables were used and histograms, for the frequency distributions, were drawn as another method to summarize and interpret intelligibly the results obtained from the tests.

A quick survey of the tables and of the histograms reveals clearly three definite facts: 1) the chief difference between the university students' reading abilities in Arabic and in English lies in the rate of reading. 2) There is no significant difference between the skill of recognizing general ideas of what is read in English and what is read in Arabic by most of the groups. 3) With the exception of the social studies group, whose general educational ability is significantly lower than the other students, there is hardly any difference between the ability of comprehending an Arabic text and English text.

From a careful examination of Tables 5 and 9, and figures 1, 2, 7 and 8, it becomes quite clear that the fastest readers in English equal the fourth-

place readers in Arabic. The fact is, as exhibited by Table 5, that 84 subjects out of 143 first-year students were able to read at a rate of 222 words per minute in Arabic; while only 30 out of 143 subjects were able to read at a rate of 138 words per minute in English. Out of the 143 subjects, 3 read at a rate of only 30 words per minute in English. This rate is even lower than that of Barbra, a first-grade pupil who read at a rate of 39.6 words per minute, in Buswell's experiment of 1922. The slowest of the 143 Arabic readers were also 5, but they read at a rate of 91 words per minute, which is three times as fast as the 30 words of the slow readers in English.

It is clear from Table 9 and Figures 7 and 8 that 90 out of the 144 fourth-year Arabic readers, representing the fast readers, read at a rate of 222 words per minute; while the 41 fast readers of English read at a rate of only 138 words per minute. Only one subject out of the whole population read at a rate of 30 words per minute in English; and three read at a rate of 91 words per minute in Arabic.

It will be, then, a matter of interest to determine whether the fourth-year students were different, in the rate and quality of their reading for general ideas from the first-year students. The mean of the rate for the fourth-year students is 101 words per minute in English and 199 words per minute in Arabic. The first-year students' rate of reading in Arabic and in English is 196 words per minute and 96 words per minute respectively.

From this and a close scrutiny of the range of both groups' rate of reading, it seems safe to conclude that there is hardly any notable difference between the first- and the fourth-year students that might indicate any development or growth in the rate of reading from first-year university up to the fourth-year. This deficiency in the growth of rate of reading is likewise notable between the two groups in reading Arabic.

The principal significance of comparing the first-year and the fourth-year students' reading rate lies in the fact that throughout the four years of university, the students have hardly made any progress in the speed of their reading. This furnished evidence that training and the individual amount of reading practice is a direct cause of progress and growth in the rate of reading. This evidence becomes especially stronger, when the Iraqi rate of reading progress is compared to that of the English readers. Tables 1 & 2, Chapter V, show the big difference between the average of the English G.C.E. students' rate of reading, which is 191.24 words per minute, and the reading rate of the P.G.C.E. University students, who read at an average rate of 373 words per minute.

It is an evident fact that, though there is no great difference between the rate of the G.C.E. students, reading English, and the Ifaqi first-year university students, reading Arabic, there is a wide gap between the rate of the Iraqi fourth-year university students reading Arabic and the rate of the

P. G. C. E. English students, reading English. This is certainly due to the amount of reading that the English students experience, after the G. C. E. level of education, at the university and in their private lives.

However, this comparison suggests three important and significant facts: 1) Iraqi readers are, in general, slow in reading both English and Arabic. 2) There is only very little progress in the speed of their reading after the elementary stages of reading. This, without doubt, is due to the lack of training and experience in reading. Iraqi students hardly read books apart from their texts. The students were asked if they used to read other books besides their textbooks; and, if they did, how many a year. The answers were unanimously in the negative. Shortage of time was given as an excuse. This also explains how important it is to read fast. Certainly the Iraqi students would read other books in addition to their texts if they read at a fast rate and consequently enjoyed reading more. 3) These students' rate of reading could, of course, be increased by training and practice. Since the G. C. E. students, whose rate of reading English was nearly equal to the Iraqi rate of reading Arabic, had improved their rate of reading greatly by the time they reached the P. G. C. E. level, there is no reason why the Iraqi could not do the same.

TABLE 5

Frequency Distribution of First-year Students' Rate of Reading

English		Arabic	
W.P.M.	No. of Students	W.P.M.	No. of Students
138	30	222	84
122	17	192	17
105	25	163	27
94	6	144	1
82	24	126	7
64	24	105	2
48	14	91	5
30	3		
N = 143		N = 143	
Mean ofW.P.M. = 95.59		Mean of W.P.M. = 195.88	

Figure 1

First Year Speed

English

N. = 143

Figure 2

First Year Speed

Arabic

N = 143

85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5

30 48 64 82 91 107 126 144 163 192 222

A study of Table 6 and Figure 3, where the recognition scores of the first-year Baghdad University students were plotted, illustrates the difference that exists between the ability of recognizing ideas expressed in Arabic and ideas presented in English for the group as a whole. While figures 3A and 3B point out the absence of significant differences between Arabic-recognition ability and English-recognition ability of the College of Medicine and the College of Arts.

Tables 10 and 11, and Figures 9, 10, 11 and 12, where the fourth-year recognition data is exhibited, indicate clearly the absence of significant differences between these groups' recognition of Arabic ideas and their recognition of English ideas. The social-studies group, whose scores are plotted in Figure 11, is an exception. A significant difference does exist between their performance in Arabic and their performance in English.

In order to provide a significant evidence of the growth of the ability of recognizing general ideas, read in Arabic and English, throughout the university course, a comparison of the first-year and the fourth-year students was carried out. Unfortunately, no noteworthy growth in recognition ability was shown; only one student in each case was the cause of the first-year's lower mean score than the fourth-year's. This indicates that approach towards reading maturity was at a standstill during the four years of university life.

Tables 14, 15, 16 and 17 present the percentages of recognition of general

ideas, in English and in Arabic. Each percentage was computed according to the rate of reading. A study of these tables reveals an important fact that all fast readers are good readers; yet all good readers are not necessarily fast readers, no matter whether they read Arabic or English or whether they are first-year or fourth-year students. Previous researches, discussed in Chapter 3, proved that good comprehension accompanies fast reading. The faster one reads the less distracted one is.

A careful examination of Tables 7 and 12, and Figures 4, 4A, 14, 15 and 16, in which the comprehension data of the first-year and the fourth-year students at Baghdad University is plotted, provides two significant pieces of evidence: 1) Though the majority of the first-year students tend to comprehend better reading material in Arabic than in English, yet the ability of the students of the College of Arts shows no sign of difference etween comprehending written Arabic or written English. A meaningful explanation for this may be the fact that the Arts students, being interested in literary material in general and in English literature in particular, read the story, contrary to the other students in English, even in their private studies. 2) With the exception of the social-studies group, all the fourth-year groups' quality of comprehension is almost the same in Arabic and in English. The significant difference between the English and the Arabic comprehension achievement of the social-studies group is due, as has been already stated,

to the relatively low standard of these students' general educational ability.

The complex nature of Arabic structure would not possibly help the fourth-year students to decipher meaning better from written Arabic than written English. The Arabic grammar is expressed, in written language, through certain devices, known as 'dhamma' ('), 'phatha' (´), 'kasra' (˛) and 'sekoon' (°), placed above or under the letters of a word (sentence) to indicate tense, case, mood or voice. For example, the word أدرس 'adrus' could mean either I study or (you) study (in the imperative). When the accent is above the first letter, i.e. أَدرس it means I study; but when the accent is under the first letter, i.e. إِدرس it means (you) study (in the imperative).

Another example, using the root[1] of the same word which is دَرس shows four different pronunciations of the word, imposed by its grammatical structure, followed, as a result, by four different meanings. The word gets its first meaning which is 'lesson', when a 'phatha' is placed above the first letter, and 'sekoons' are placed above the other two letters, i.e. دَرْسْ This is pronounced 'dars'. The second meaning of the word, which is 'he studied' (in the past) comes into existence when a 'phatha' is placed above each letter of the word (دَرَسَ) which will be pronounced 'darasa'. The word 'dars' comes to mean 'somebody had studied him', in the third place, when a 'dhamma' is placed above the first letter; a 'kasra' is placed above

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1. An Arabic word consists basically of three, four or five letters. The three-letter word, which is most frequently in use, is called the root, and it changes its shape and meaning by prefixes, infixes and suffixes.

the third letter, دَرِسَ 'durisa'. The word lastly becomes 'he taught somebody', when a 'phatha' is placed above the first letter and the last letter of the word and a 'shada', which is an emphatic device indicating a sound of two letters combined in one, above the second letter of the word, دَرَّسَ 'darrasa'.

These grammatical signs and accents, which seem so easy to recognize and understand, very rarely do appear in modern Arabic writing. They are usually found in classic Arabic writing like the holy 'Quran'. The absence of these grammatical devices makes the complex nature of reading even more complicated. Unless a reader of Arabic is quite familiar with the oddities of its grammar, it is hard for him to get meanings out of a printed page. This problem becomes even more serious when the reading material gets more difficult as a result of more complicated ideas and consequently more complicated structures of words, sentences, and paragraphs. This might also be counted as another reason for the students' slow reading in Arabic.

The reading material of the first-year students, being a simplified novel, was rather easy in content and structure. The Arabic translation of the story seemed especially easy to most of the students because, as it was stated before, the students used the Arabic translation in their private studies preparing for the government examination, while the fourth-year reading material was characterized by a relatively difficult content, and complicated structure. Hence, the achievement of most of the fourth-year students in comprehension

was identical in Arabic and English. One might conclude from this that Iraqi university students react to reading Arabic and English in the same manner provided sufficiently difficult reading material is given to the students.

The differences of the range of the scores of the test as a whole are presented distinctly in Tables 8 and 13, and figures 5, 6, 16, 17 and 18. A wide range in ability and a large amount of reading retardation are also found in many groups throughout the university. Although the standard of reading differs from college to college, the amount of overlapping from first-year university to fourth-year university is large. Accordingly, in the first- and the fourth-year groups there are many pupils of similar reading ability. And this is an obvious sign of lack of progress.

TABLE 6

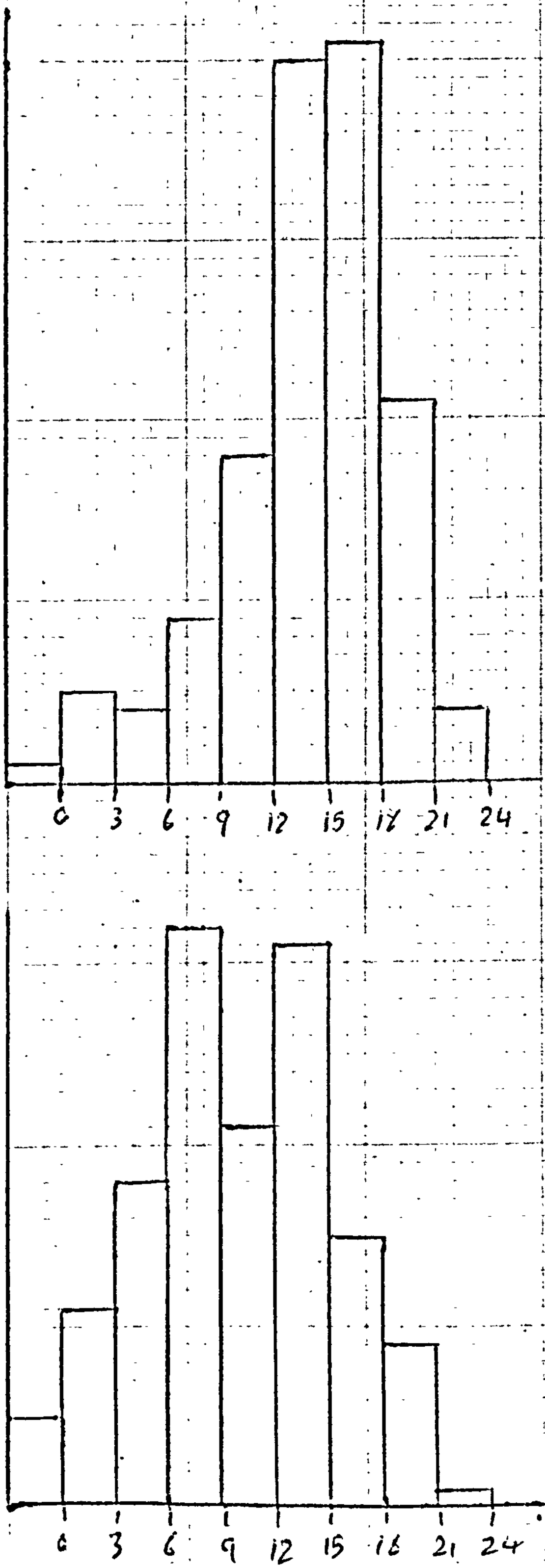
Frequency Distribution of First-year Students' Scores on Recognition Test

	Scores	Medicine	Engin. & Sciences	Arts	Education	Social Studies	Total
English	24	1					1
	21	6	2	1			9
	18	4	5	1	4	1	15
	15	9	8	6	1	7	31
	12	1	7	1	6	6	21
	9	1	11	2	10	8	32
	6	1	3	2	1	11	18
	3		5			6	11
	0					5	5
	N.	23	41	13	22	44	143
	Mean	16.70	11.41	13.15	11.59	7.98	11.39
	S.D.	4.23	5.03	4.51	3.62	4.97	5.43
Arabic	24	1			1	2	4
	21	8	5	2	4	2	21
	18	6	9	2	6	18	41
	15	5	14	3	7	11	40
	12	1	8	2	3	4	18
	9	2	1	2		4	9
	6		2	1	1		4
	3		1	1		3	5
	0		1				1
	N.	23	41	13	22	44	143
	Mean	17.35	14.56	13.38	16.50	15.64	15.53
	S.D.	4.04	4.72	5.56	4.00	5.59	4.96

Figure 3.

First Year Recognitions

196.



Arabic

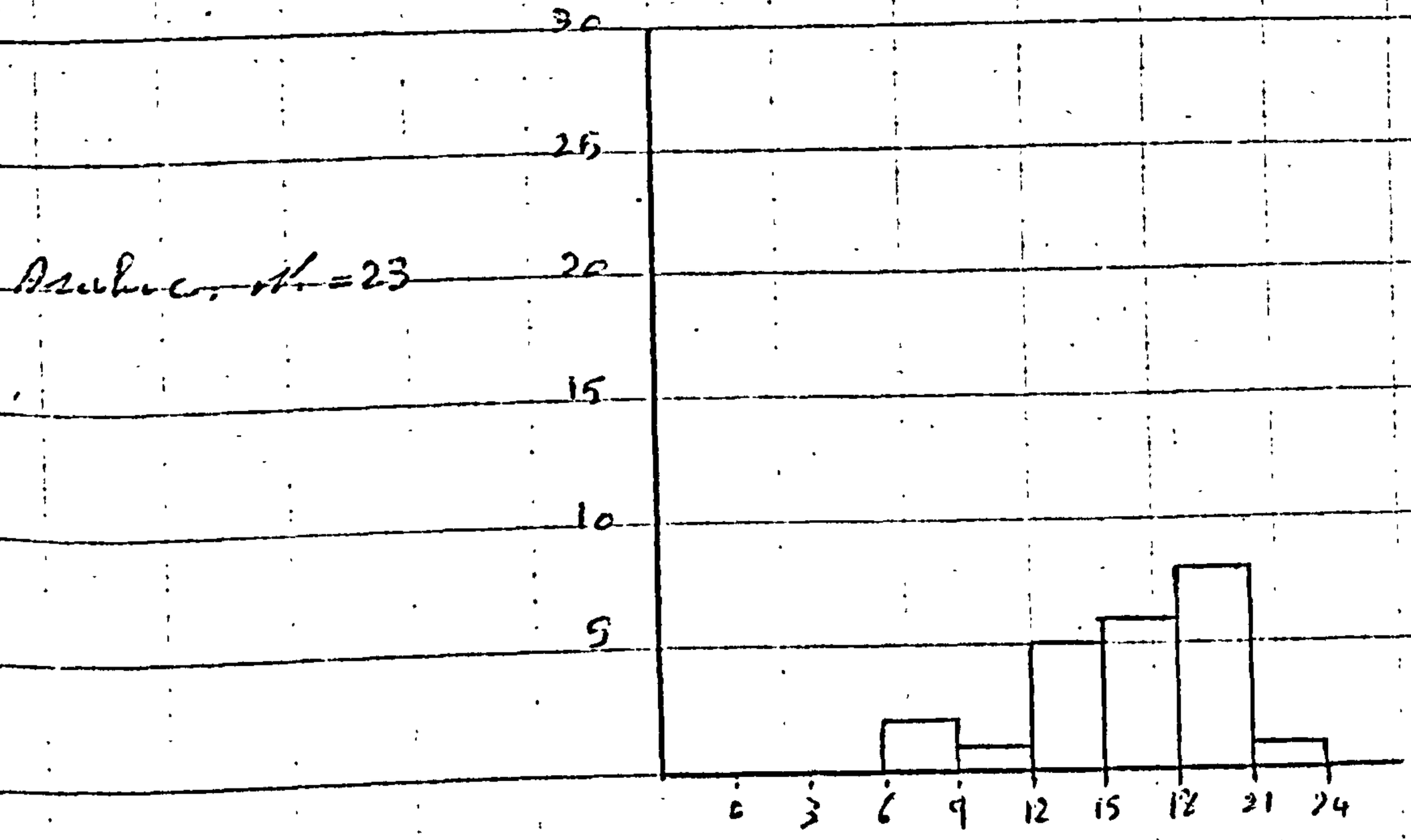
N. = 143

English

N. = 143

Figure 3A

First Medicine Recognition



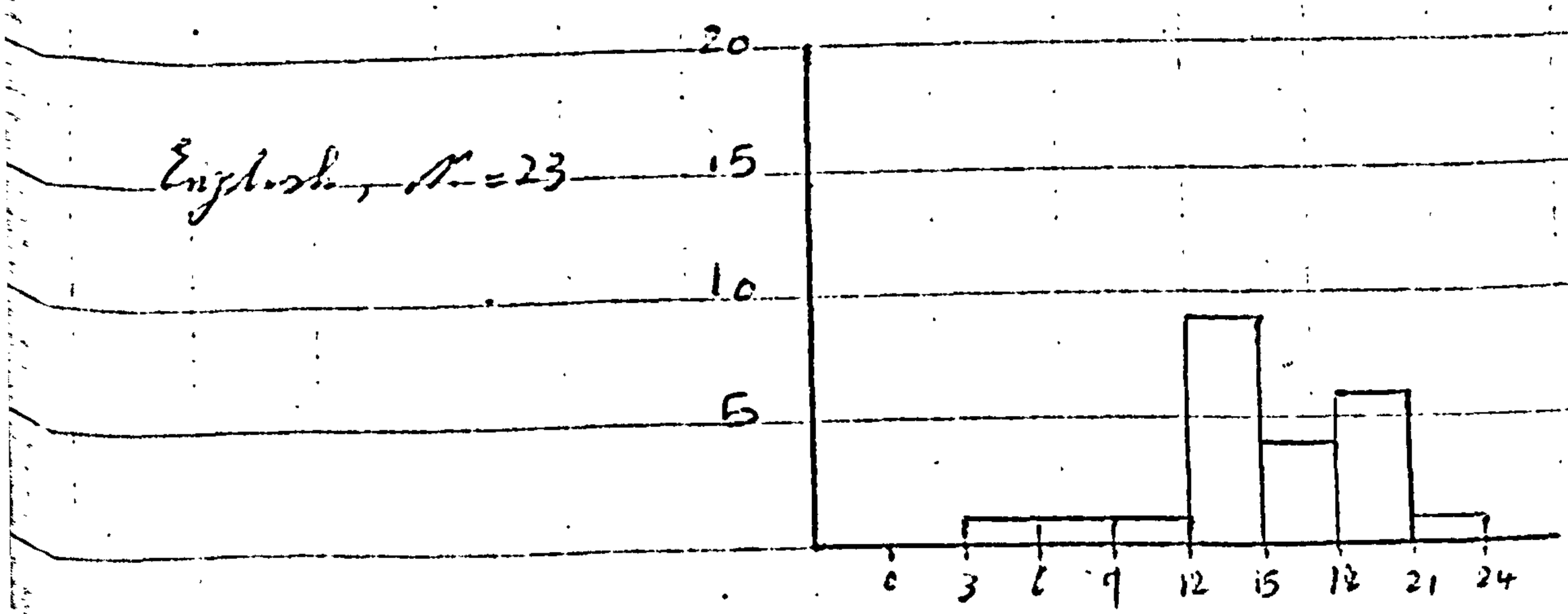
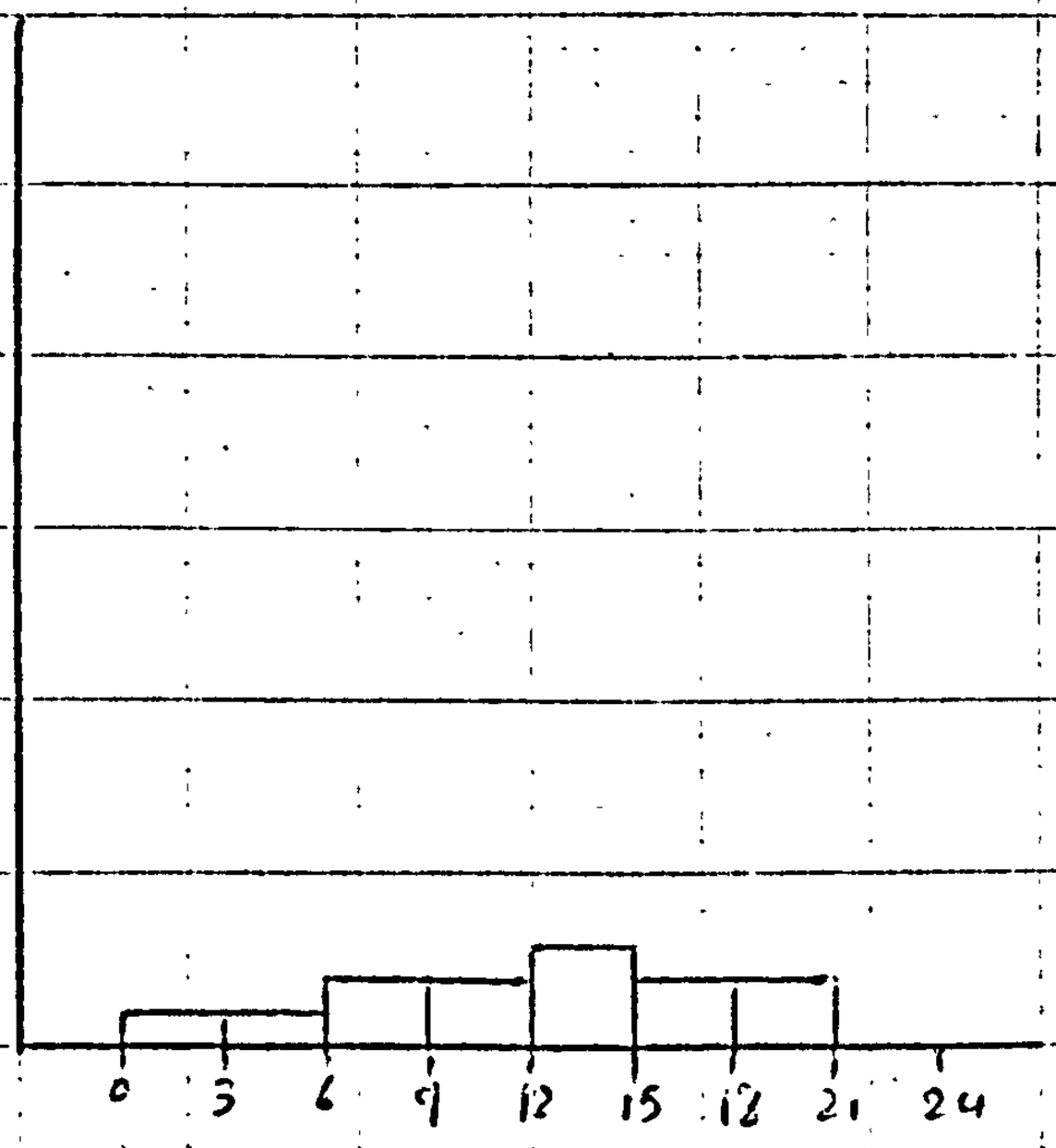


Figure 3B

First Arts Recognition

Arabic, N. = 13



English, N. = 13

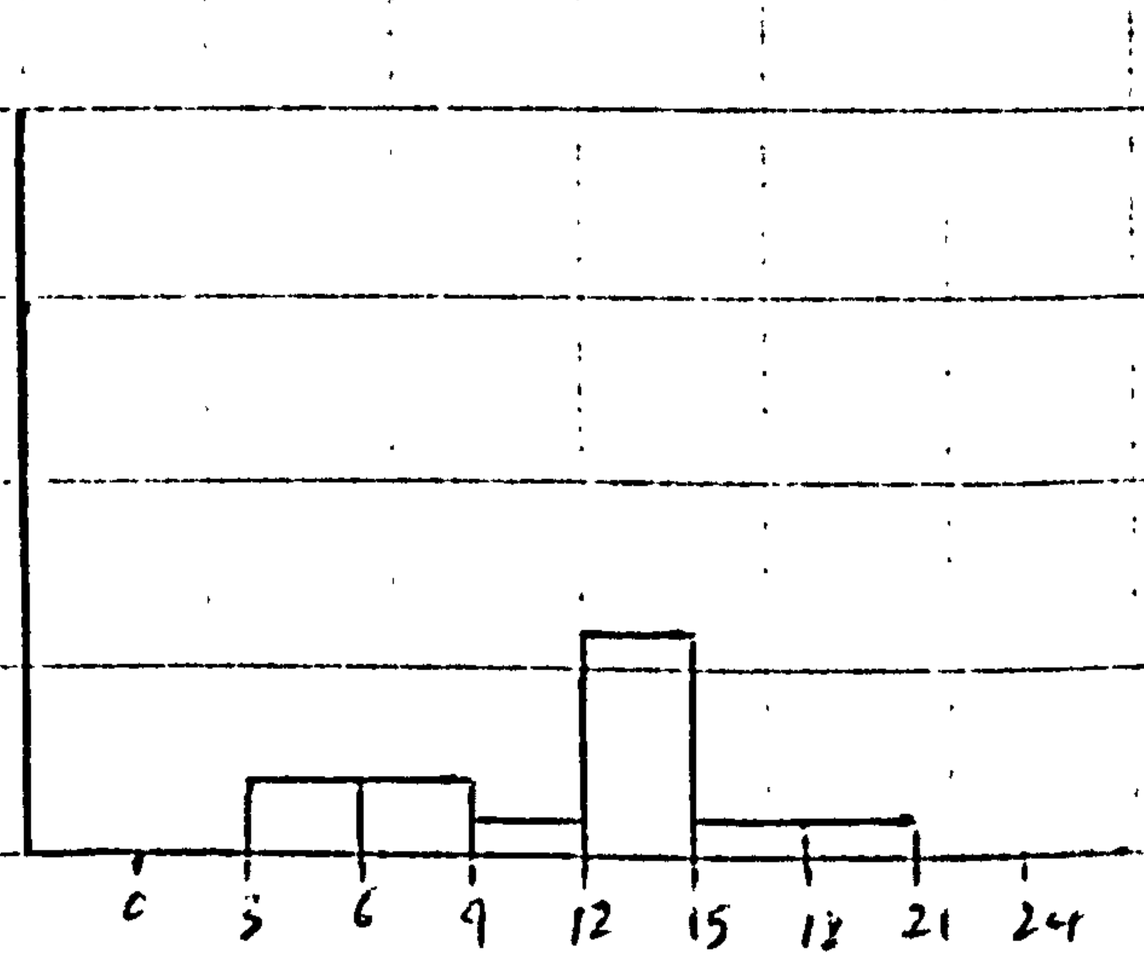


TABLE 7

Frequency Distribution of First-year Students' Comprehension Marks

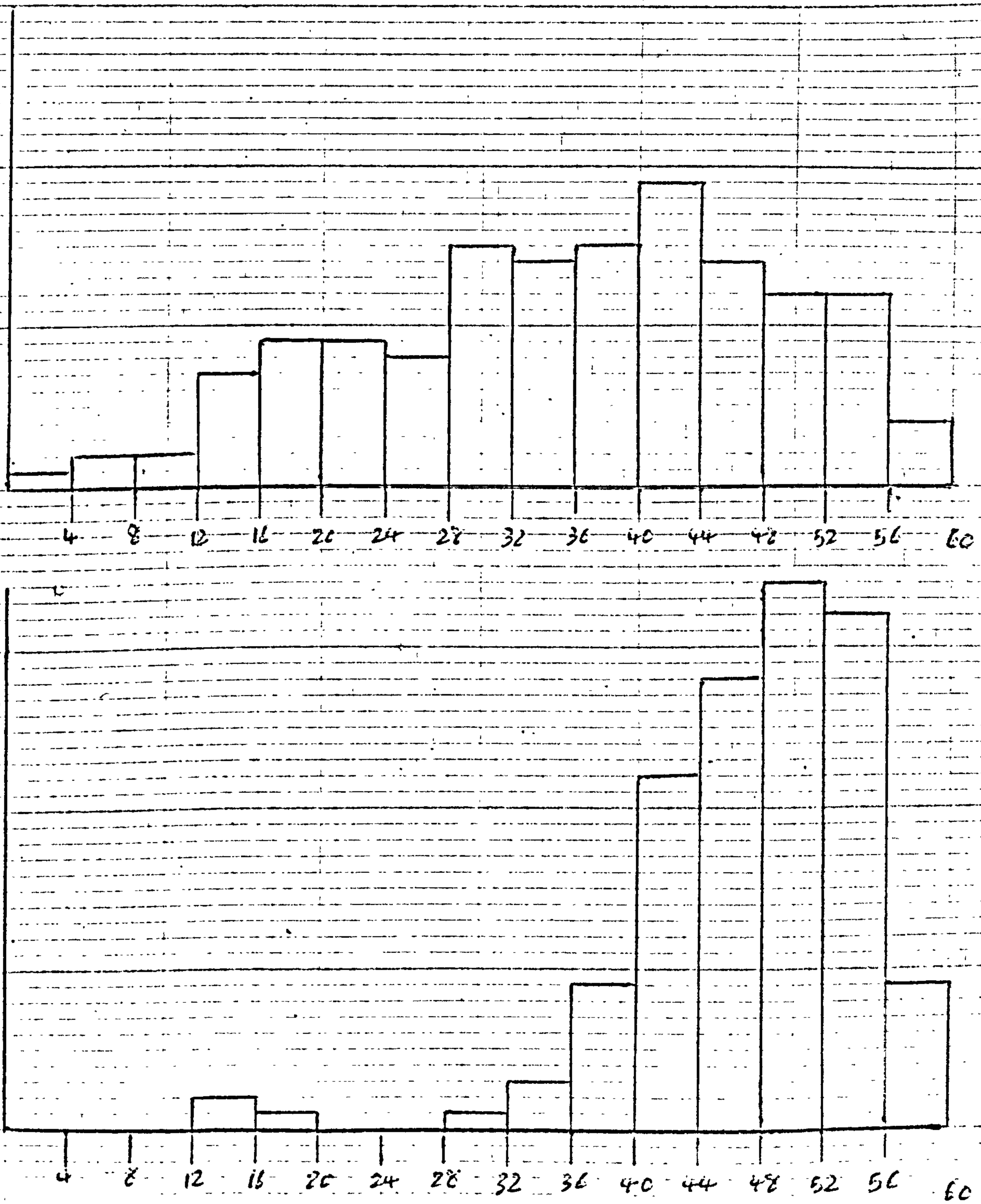
	Mark	Medicine Sciences	Engin. & Sciences	Arts	Education	Social Studies	Total
English	60	3	1				4
	56	6	2	2	2		12
	52	1	3	3	4	1	12
	48	2	3	5	2	2	14
	44	5	6	2	3	3	19
	40	2	8		3	2	15
	36	1	6	1	3	3	14
	32	1	8		2	4	15
	28		1			7	8
	24	1	2		1	5	9
	20	1	1		2	5	9
	16					7	7
	12					2	2
	8					2	2
	4					1	1
	N.	23	41	13	22	44	143
	Mean	46.78	38.78	48.31	41.09	26.55	37.52
	S.D.	11.21	10.48	6.21	10.84	11.70	13.30
Arabic	60	5	1		2	1	9
	56	6	11	5	2	4	33
	52	9	9	5	3	9	35
	48	2	7	2	6	11	28
	44	1	7		6	8	22
	40		4	1	2	2	9
	36		2		1		3
	32					1	1
	20					1	1
	16					2	2
	N.	23	41	13	22	44	143
	Mean	54.09	49.27	51.69	48.00	47.36	49.48
	S.D.	4.33	6.29	5.53	6.29	9.91	7.60

Figure 4.

200.

N. = 143

English Comprehension First Year



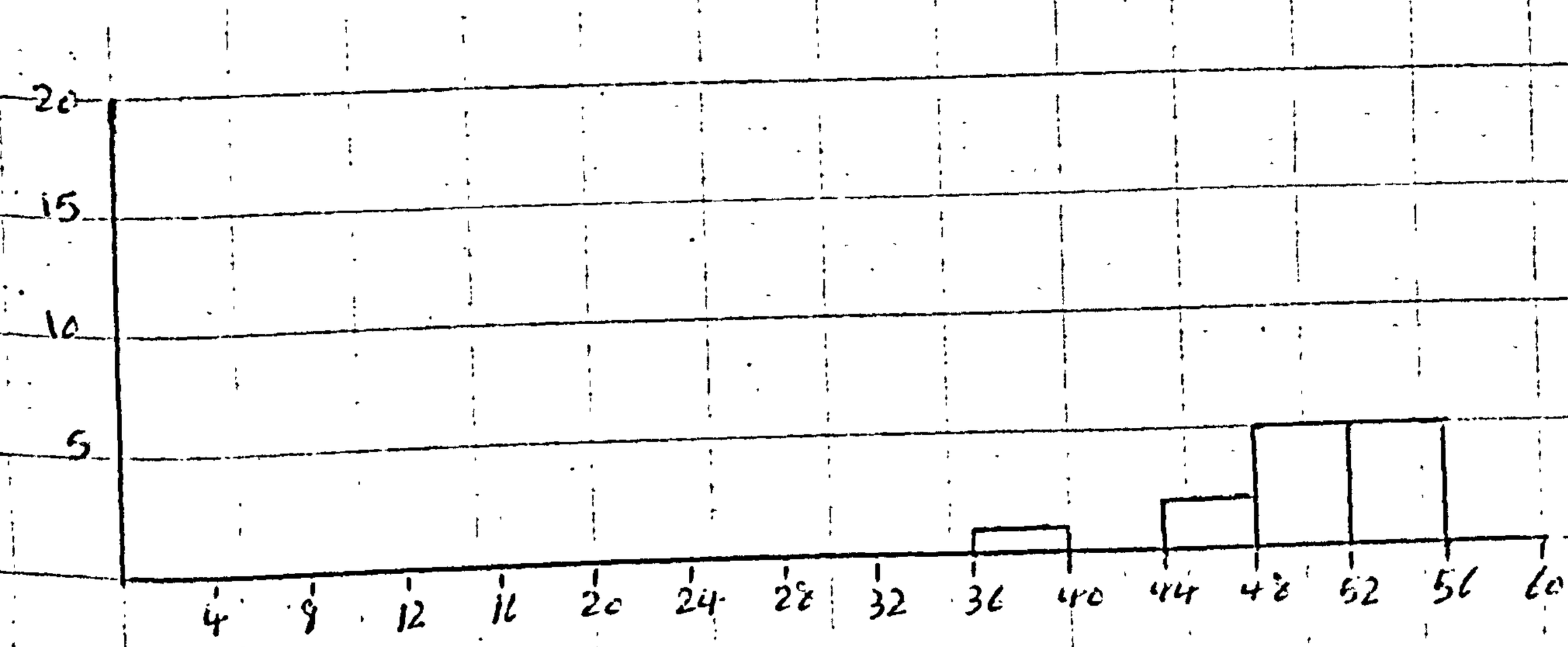
N. = 143

Arabic Comprehension, First Year

Figure 42

First Arts Comprehension

Arabic, N. = 13



English, N. = 13

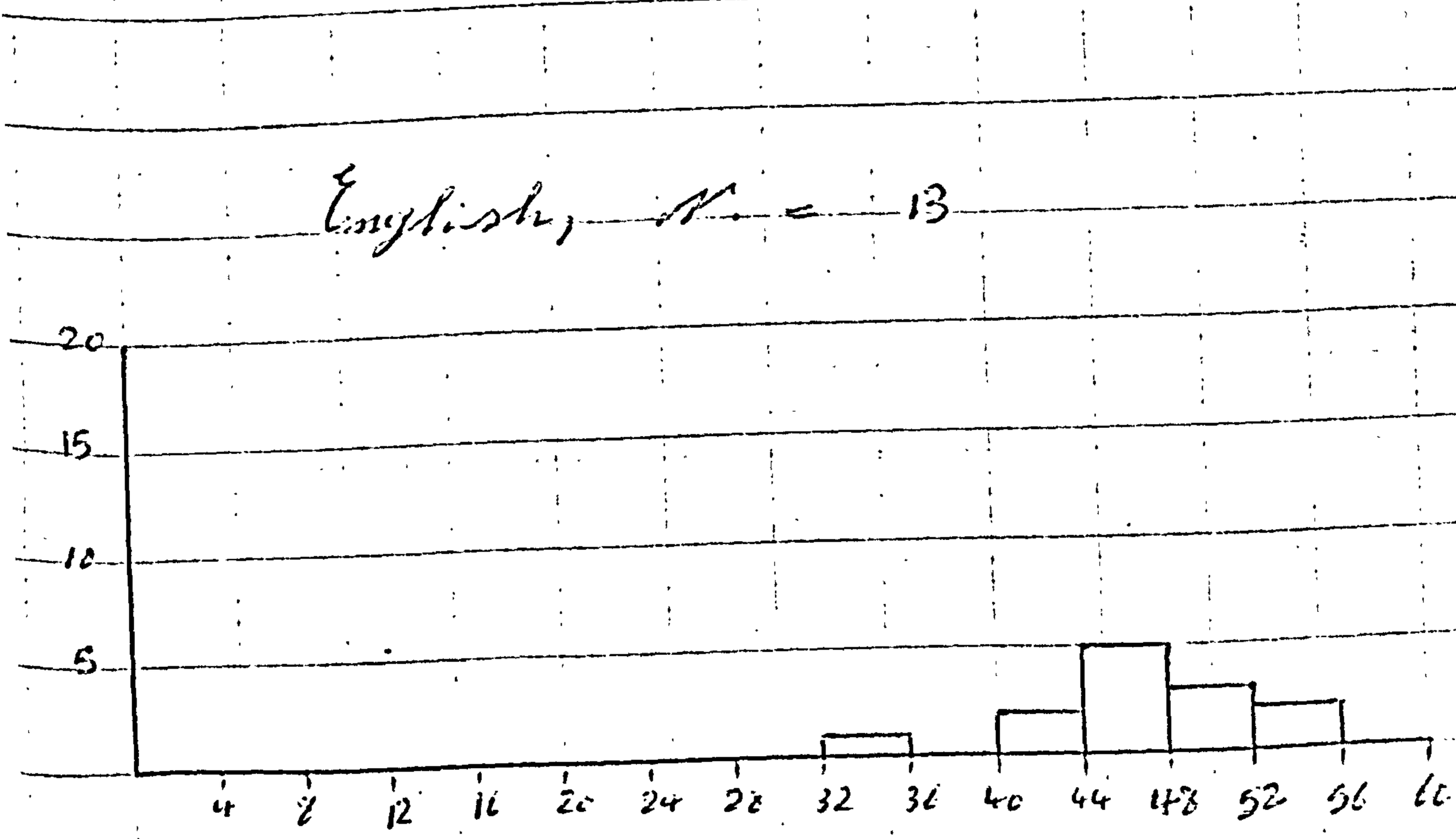


TABLE 8

Frequency Distribution of First-year Students' Scores on the Reading Test as a Whole

	Intervals	Medicine	Engin. & Sciences	Arts	Education	Social Studies	Total
English	91-100	6	1	-	-	-	7
	81-90	6	-	5	3	-	14
	71-80	5	10	5	6	3	29
	61-70	4	15	2	6	5	32
	51-60	-	10	1	5	9	25
	41-50	2	3	-	2	10	17
	31-40	-	2	-	-	10	12
	21-30	-	-	-	-	7	7
	N·	23	41	13	22	44	143
	Mean	71.87	57.78	69.92	60.72	40.36	56.42
	S. D.	15.26	11.84	8.51	11.28	14.70	17.21
Arabic	91-100	7	4	2	2	6	21
	81-90	12	20	5	7	18	62
	71-80	4	12	4	11	11	42
	61-70	-	2	1	2	6	11
	51-60	-	3	1	-	1	5
	41-50	-	-	-	-	1	1
	31-40	-	-	-	-	-	-
	21-30	-	-	-	-	1	1
	N·	23	41	13	22	44	143
	Mean	86.87	78.93	80.62	79.59	77.34	79.97
	S. D.	6.76	9.65	11.01	8.32	12.92	10.70

Figure 5.

First Year Reading Test As A Whole

English

N. = 143

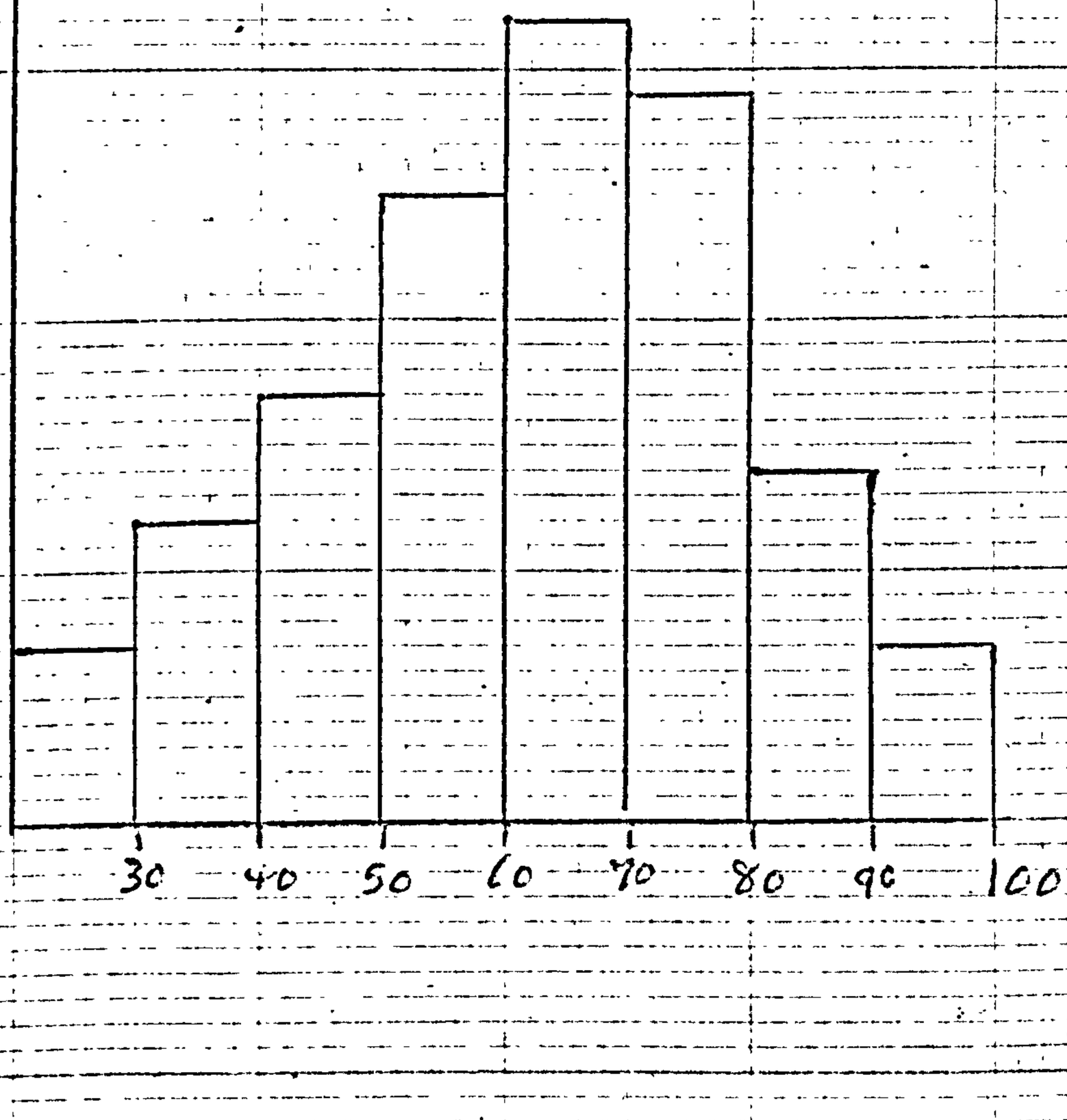


Figure 6.

First Year Reading Test as a Whole

Aculac

N. = 143

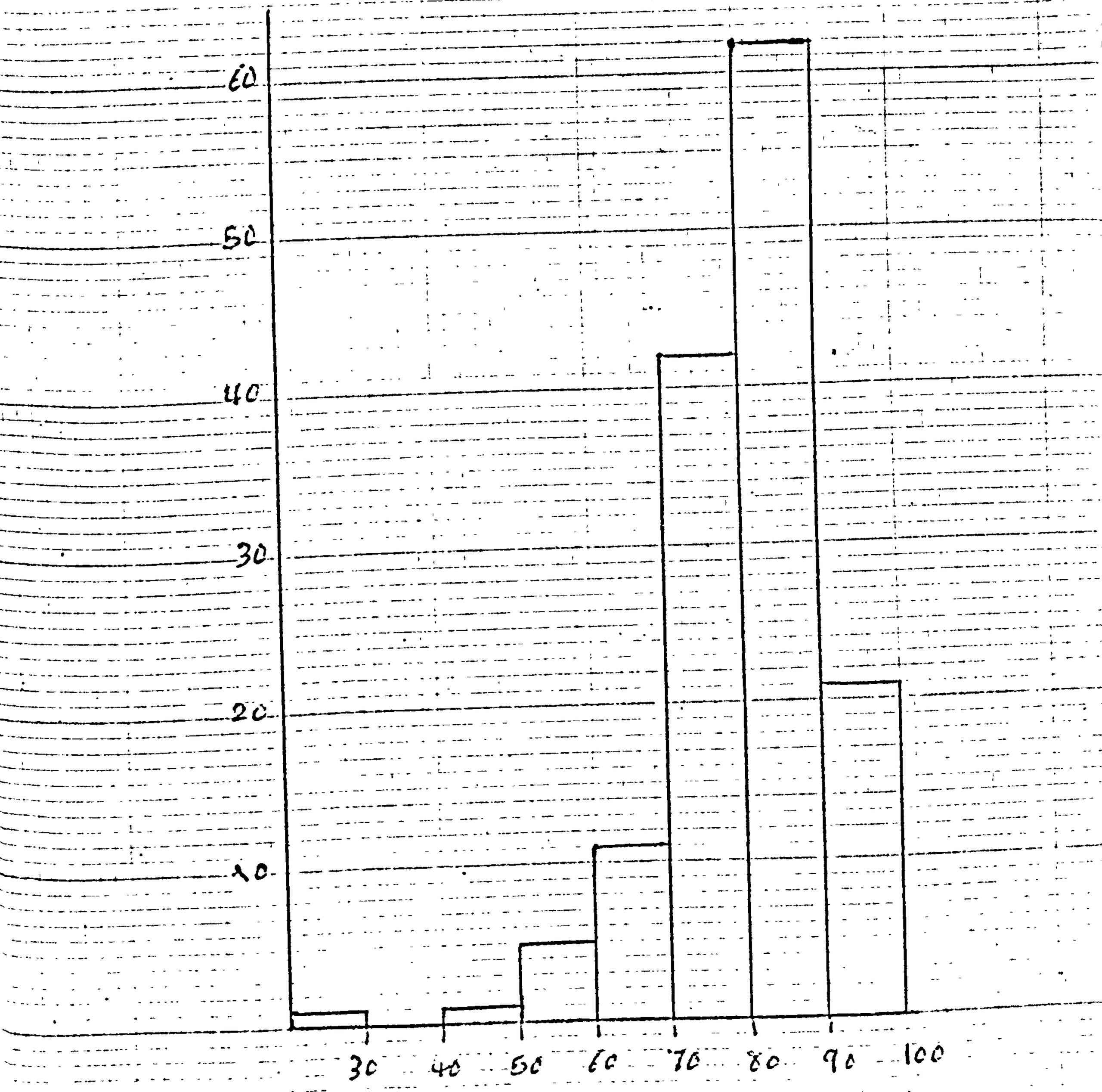


TABLE 9

Frequency Distribution of Fourth-year Students' Rate of Reading

English		Arabic	
W.P.M.	No. of Students	W.P.M.	No. of Students
138	41	222	90
122	8	192	12
105	35	163	30
94	8	144	2
82	20	126	7
64	22	91	3
48	9		
30	1		
N = 144		N = 144	
Mean of W.P.M. = 101.18		Mean of W.P.M. = 198.73	

Figure 7

Fourth Year Speed

English

N. = 144

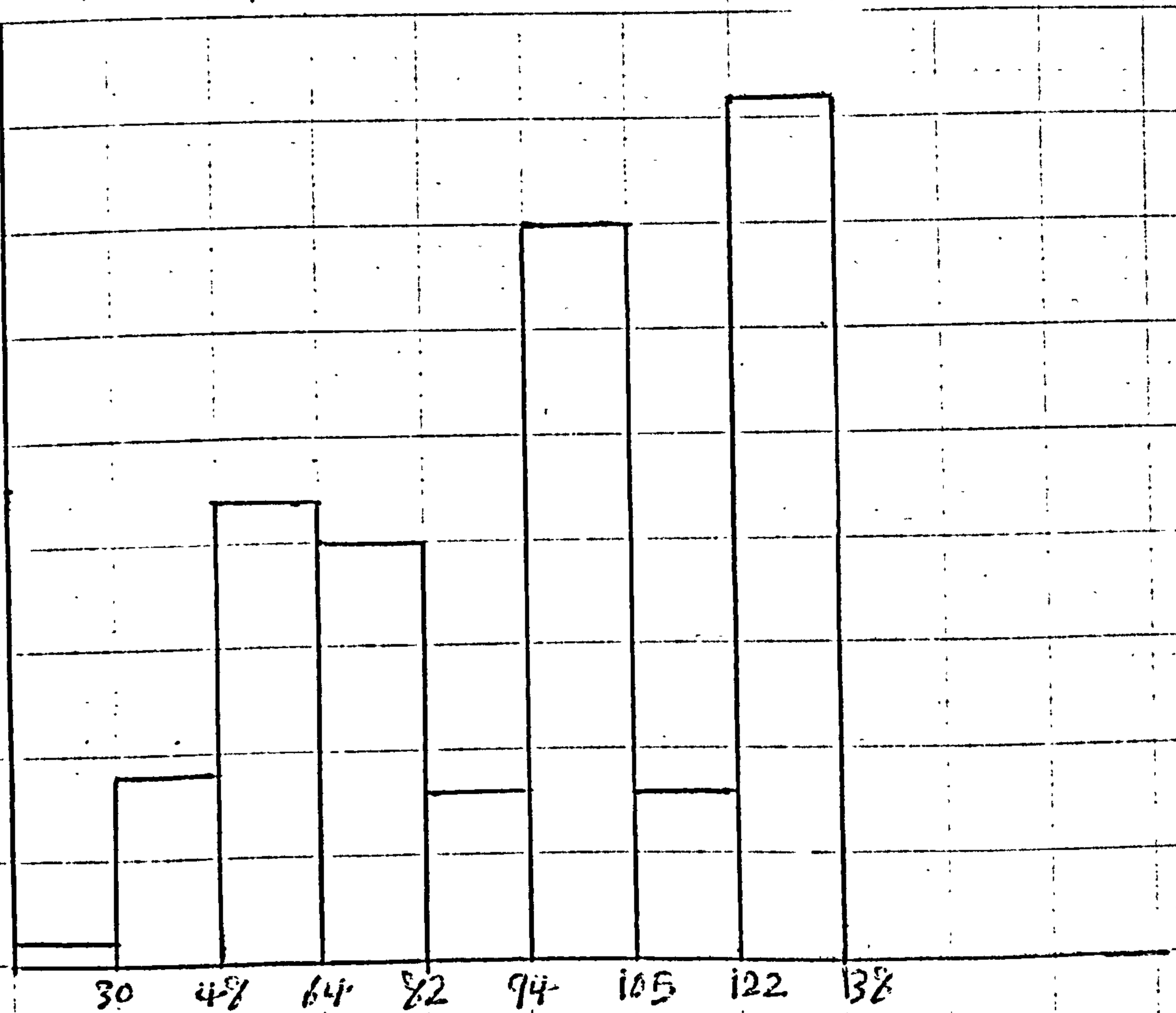


Figure 8.

Fourth Year Arabic

Speed Test.

N. = 144

80

70

60

50

40

30

20

10

91 126 144 163 192 222

TABLE 10

Frequency Distribution of Fourth-year Students' Scores on Recognition Test

	Scores	Med. & Engin.	Science	Total	Arts	Educ.	Total	Social Studies
English	24							1
	21	3		3				1
	18	4	4	8	6	5	11	1
	15	16	6	22	4	7	11	10
	12	10	8	18	2	3	5	7
	9	3	4	7	2		2	7
	6	2	7	9		1	1	11
	3		4	4				2
	0		1	1	1			2
	N.	38	34	72	14	16	30	42
	Mean	14.05	10.24	12.25	15.00	14.81	14.90	10.21
	S.D.	3.56	5.7	4.72	3.33	3.19	3.20	3.20
Arabic	24	1		1	2		2	1
	21	3	1	4		3	3	3
	18	10	9	19	7	10	17	8
	15	11	10	21	2		2	11
	12	8	10	18	2		2	10
	9	4	3	7	1	3	4	8
	6	1	1	2				1
	3							
	0							
	N.	38	34	72	14	16	30	42
	Mean	14.83	14.29	14.58	16.93	15.00	15.90	14.14
	S.D.	3.88	3.39	3.64	4.17	3.79	4.03	4.09

Figure 9.

Fourth Sciences Recognition

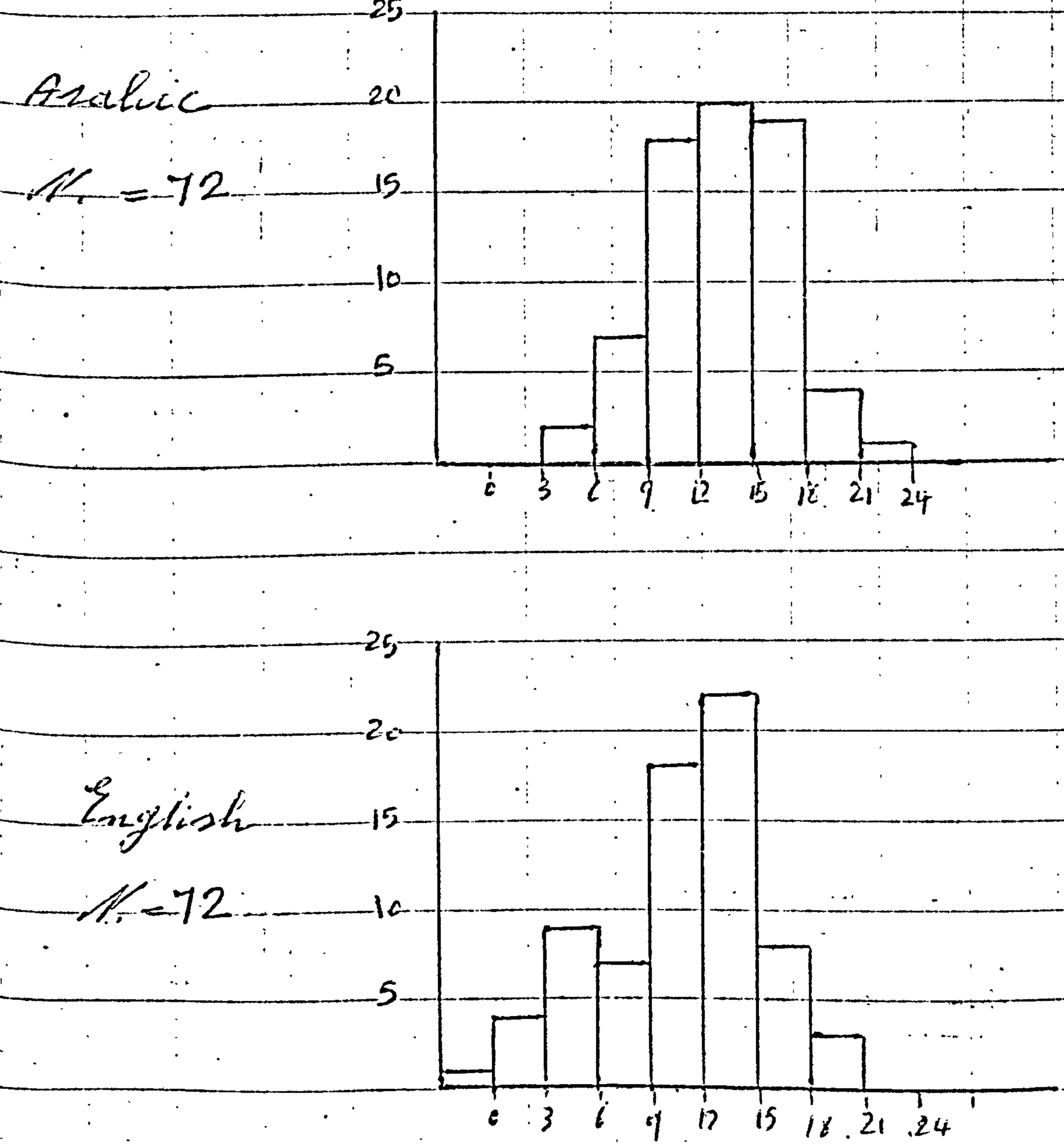


Figure 10.

Fourth Arts Recognition

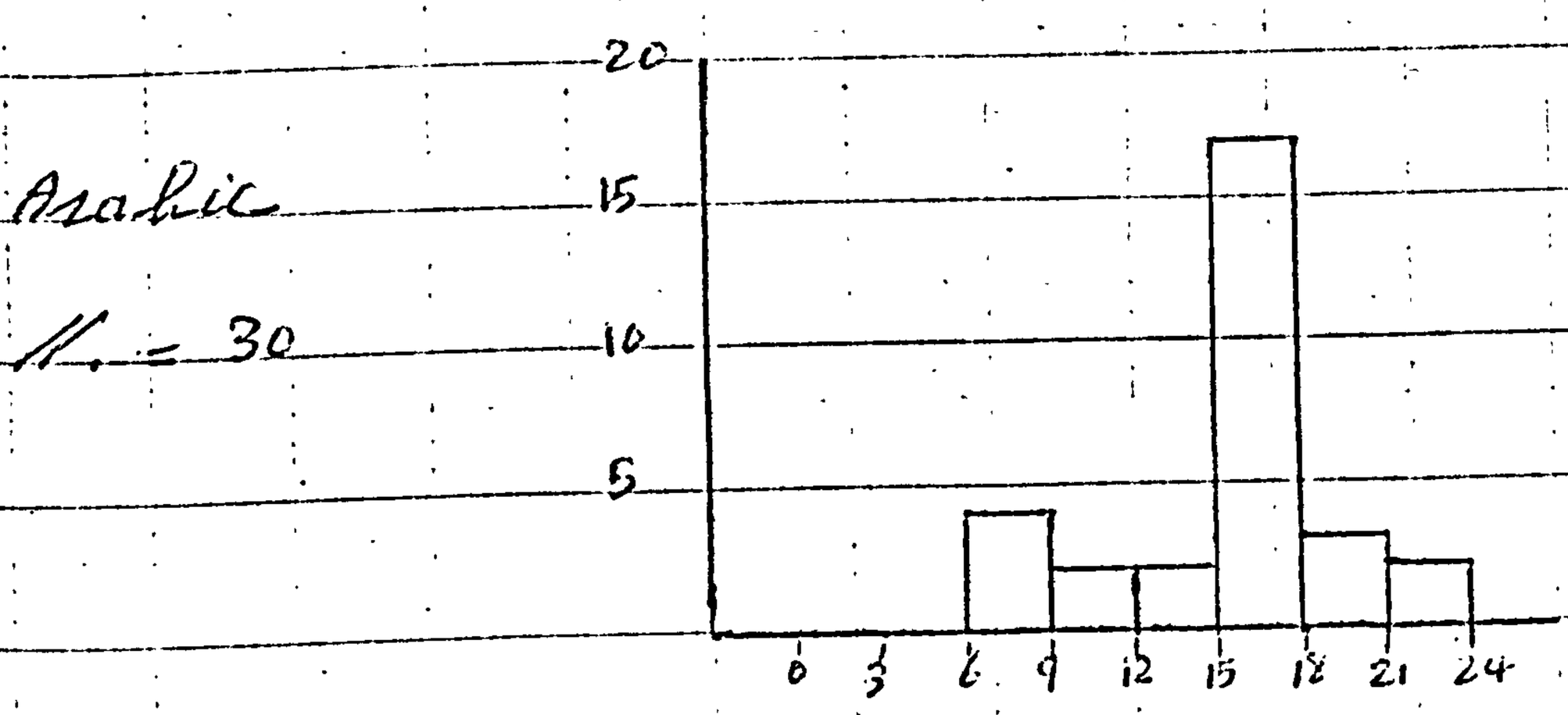


Figure 11.

Fourth Social Studies Recognition

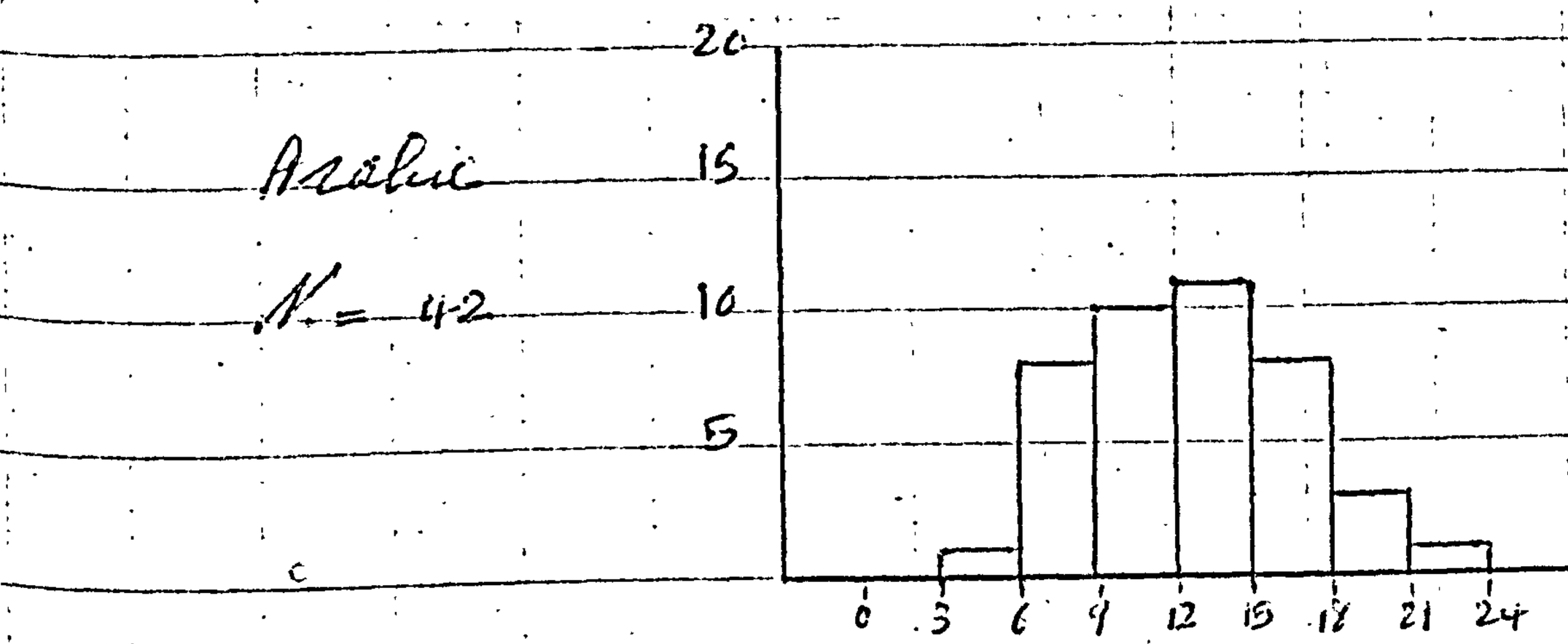


TABLE 11

Frequency Distribution of Fourth-years' Recognition Test

Scores	English	Arabic
24	1	4
21	4	10
18	20	44
15	43	34
12	30	30
9	16	19
6	21	3
3	6	-
0	3	-

N = 144

Figure 12

Fourth Years' Recognition

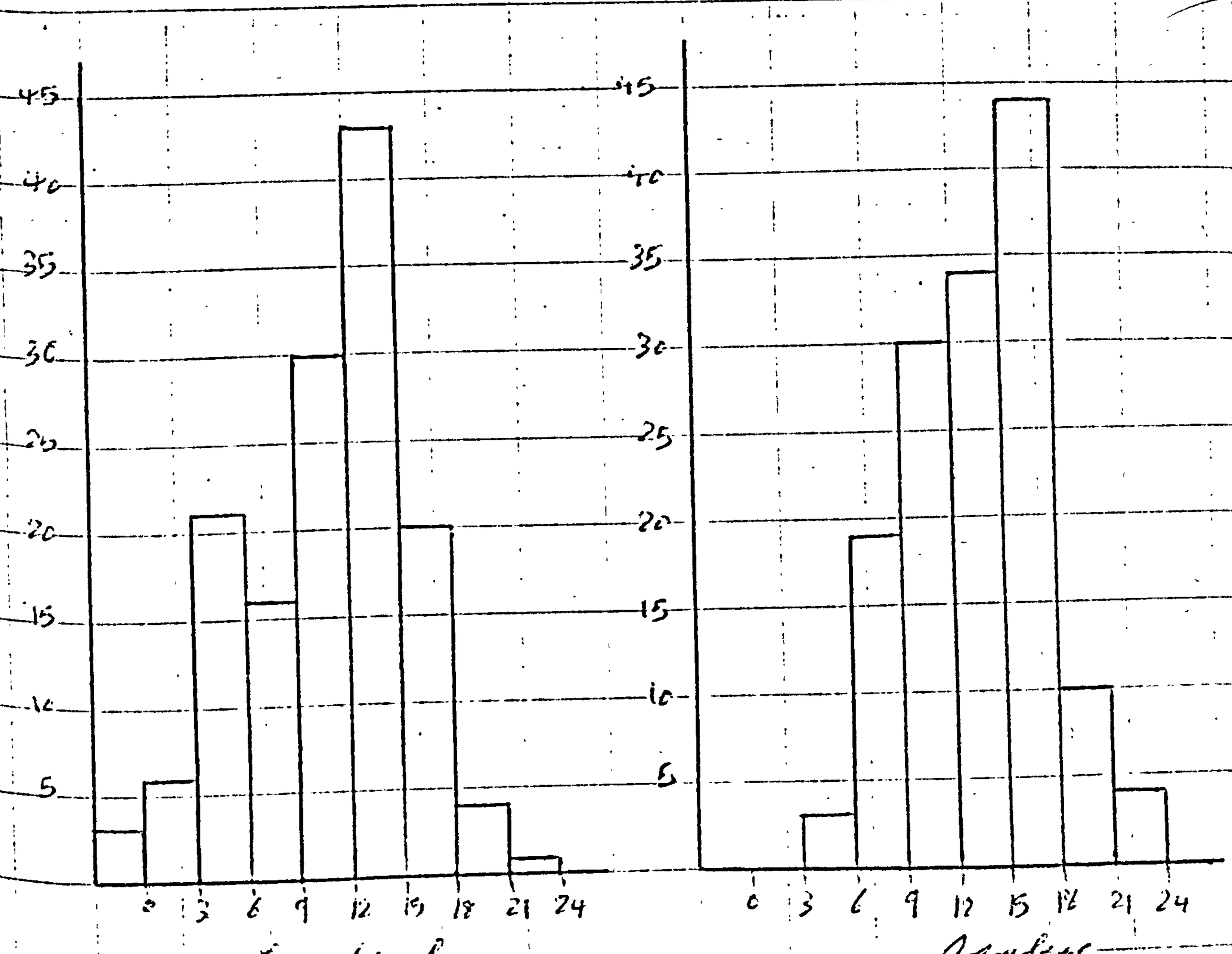


TABLE 12

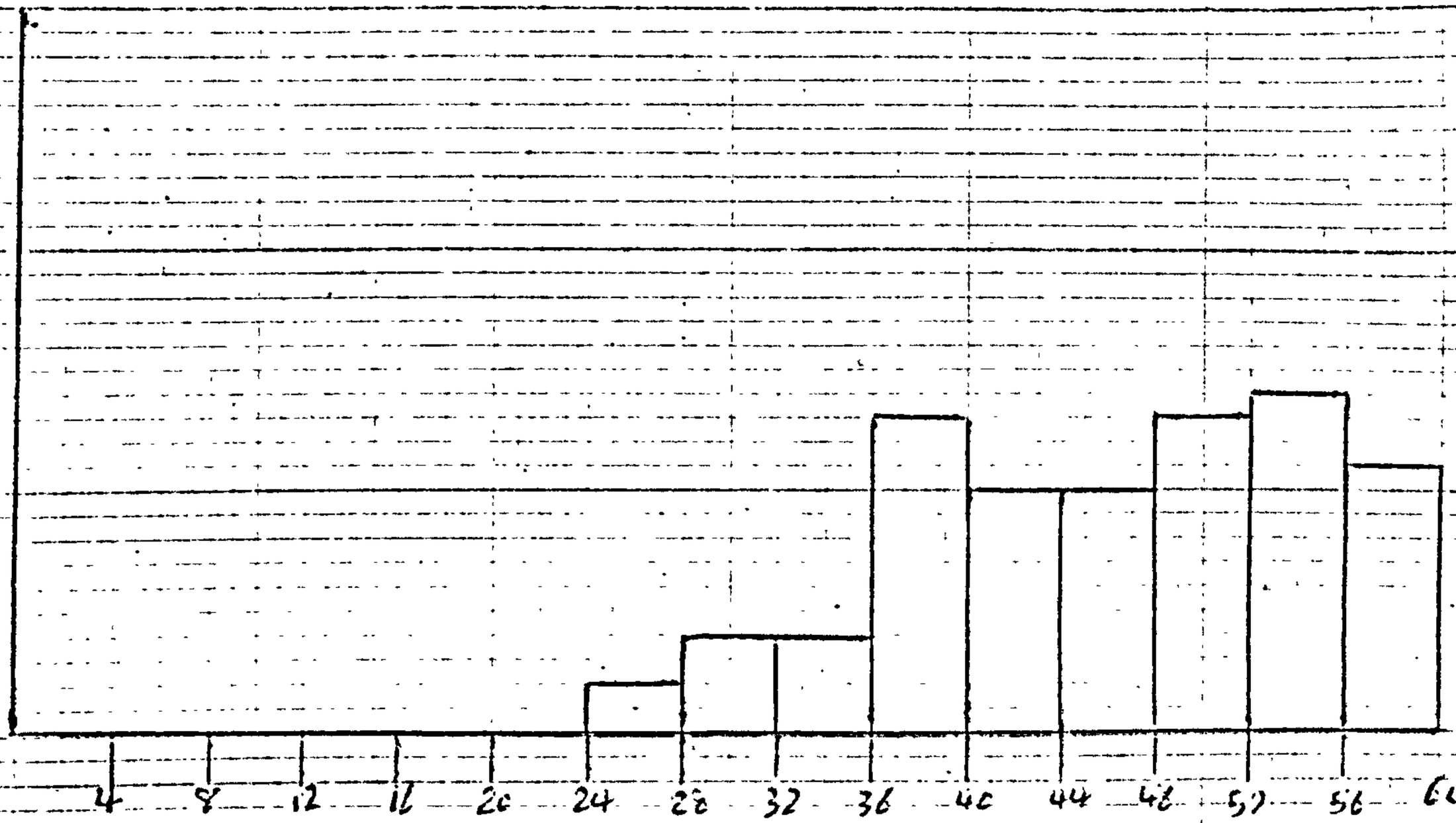
Frequency Distribution of Fourth-year Students' Comprehension Marks

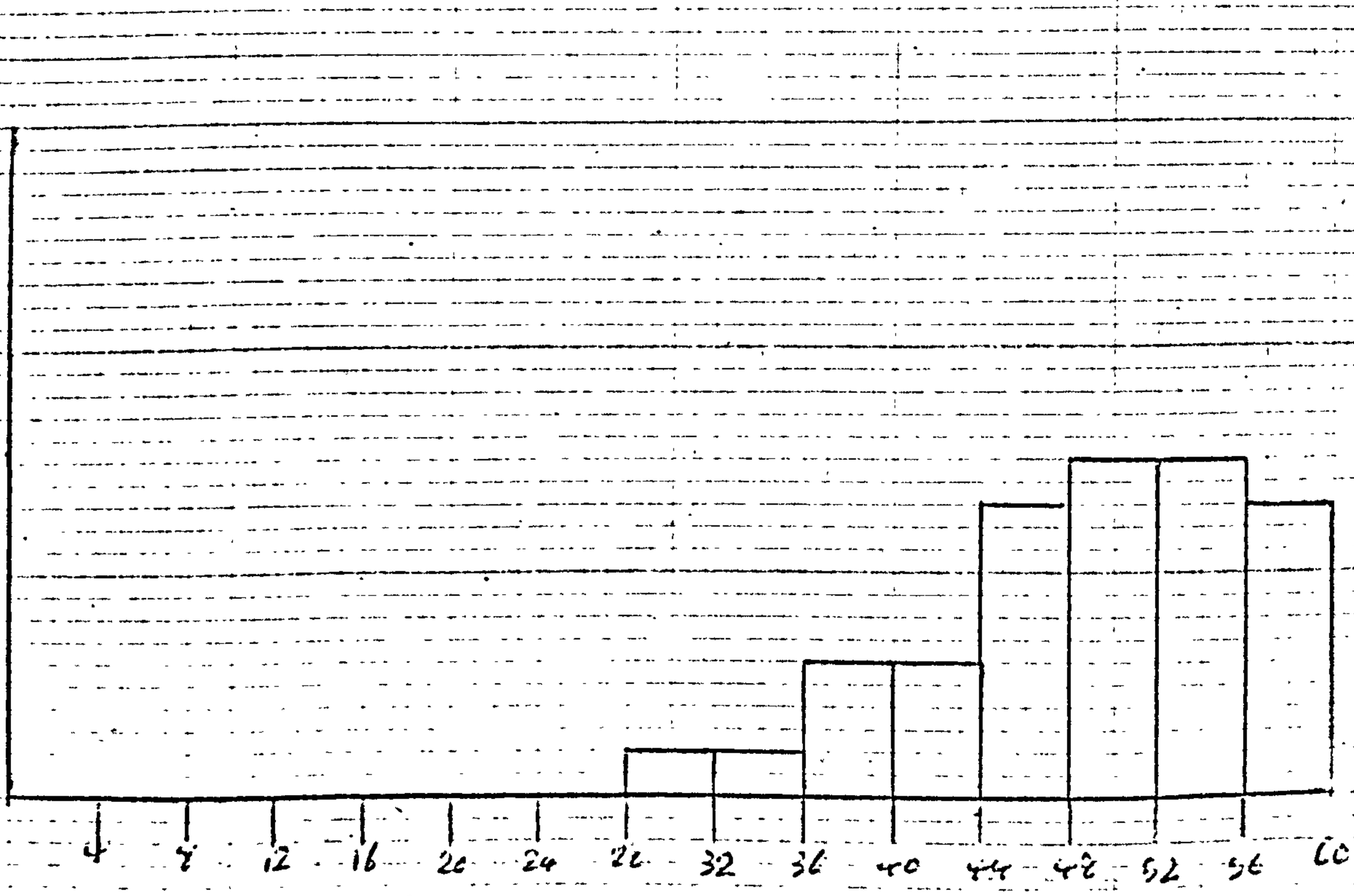
	Marks	Med. & Engin.	Science Total	Arts	Educ.	Total	Social Studies
English	60	9	2	11			
	56	11	3	14			
	52	8	5	13			
	48	4	3	7	3	3	1
	44	2	5	7	1	7	8	1
	40	2	8	10	1	1	
	36		4	4	6	1	7	1
	32	2	2	4		1	1	2
	28		2	2	2	4	6	2
	24				1	1	2	2
	20					1	1	9
	16							10
	12					1	1	7
	8							6
	4							1
	N.	38	34	72	14	16	30	42
	Mean	52.53	44.00	48.50	37.43	34.00	35.60	18.38
	S.D.	7.39	8.53	8.98	7.62	10.43	9.24	9.24
Arabic	60	8	5	13				
	56	10	5	15		1	1	1
	52	6	9	15	1		1	2
	48	7	6	13	4	2	6	6
	44	4	2	6	4	2	6	7
	40	1	5	6	2	2	4	6
	36	1	1	2	1	4	5	8
	32	1	1	2	1	2	3	5
	28				1	1	2	5
	24					2	2	2
	N.	38	34	72	14	16	30	42
	Mean	51.89	49.76	50.89	42.57	37.75	40.00	38.86
	S.D.	7.65	7.45	7.27	6.77	8.88	8.21	8.06

Figure 13.

N. = 72

Inst. comprehension, Fourth Science





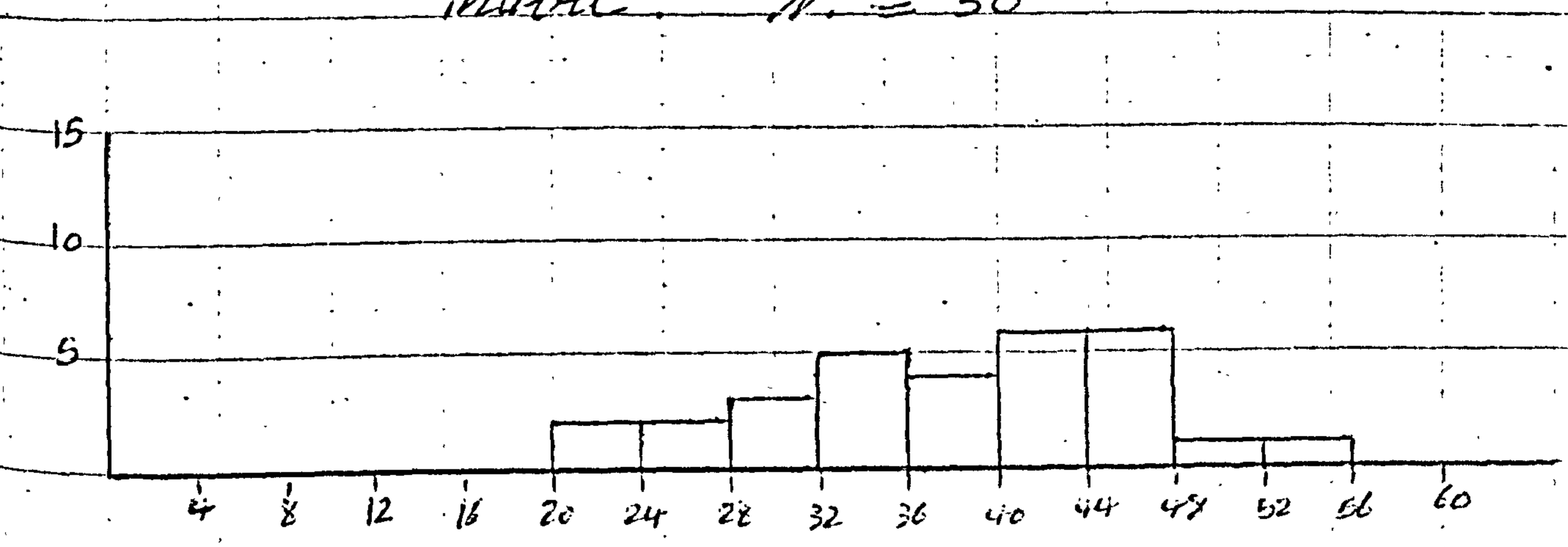
N = 72

Arithmetic comprehension, Fourth Science

Figure 14.

Fourth Arts Comprehension

Arabic N. = 30



English N. = 30

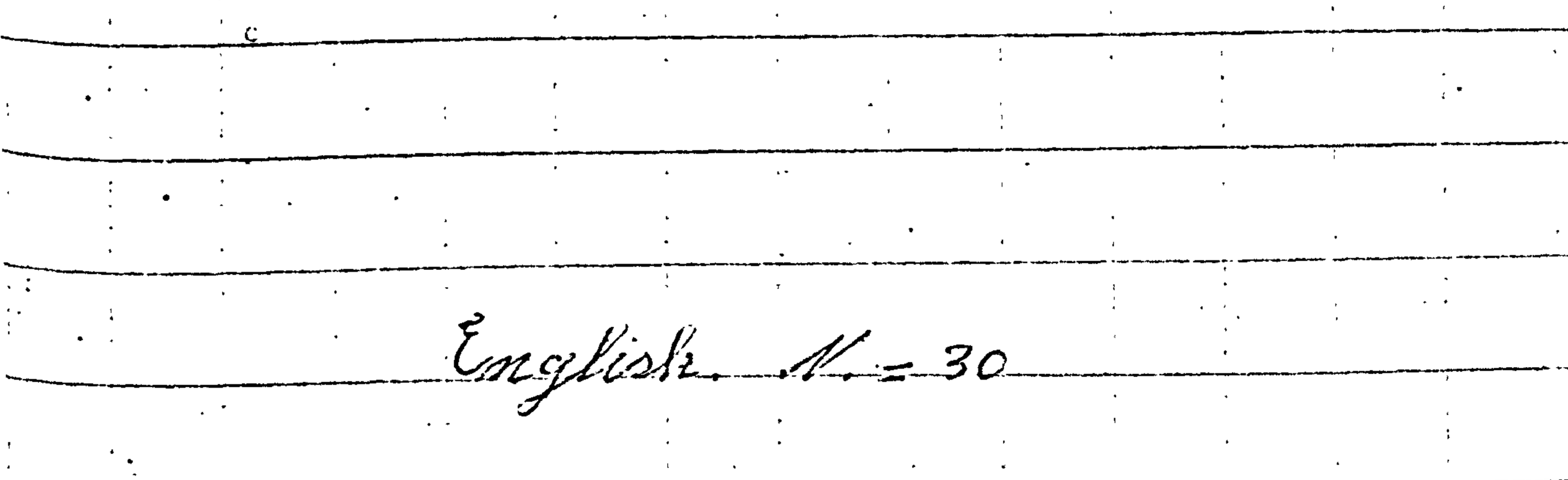
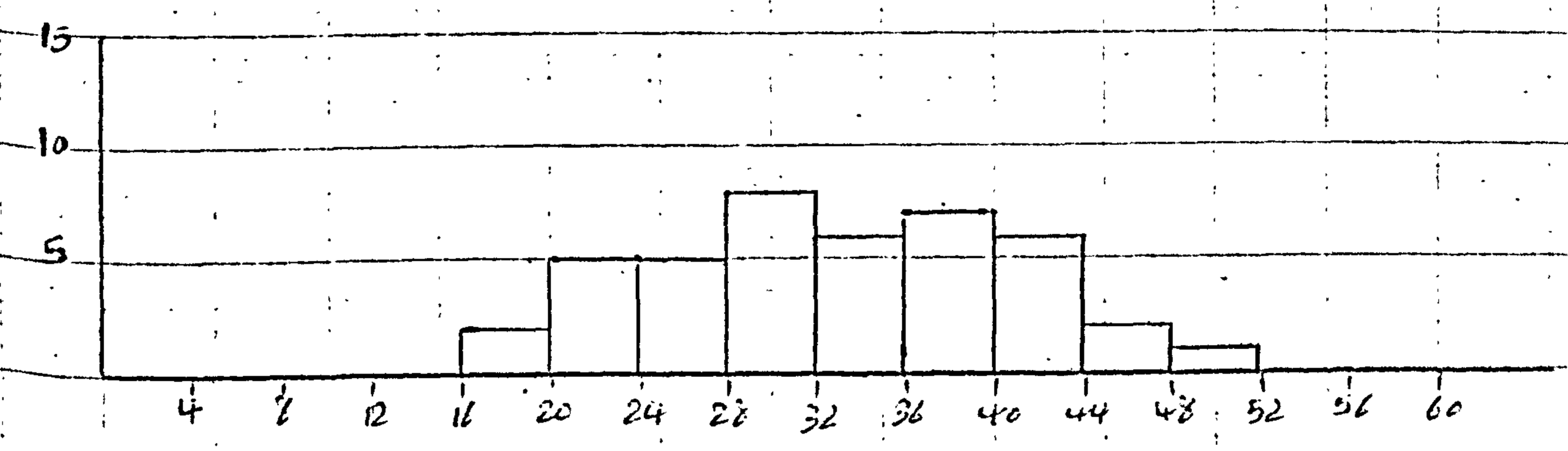


Figure 15.

Fourth Social Studies Comprehension

Arabic. N. = 42



English. N. = 42

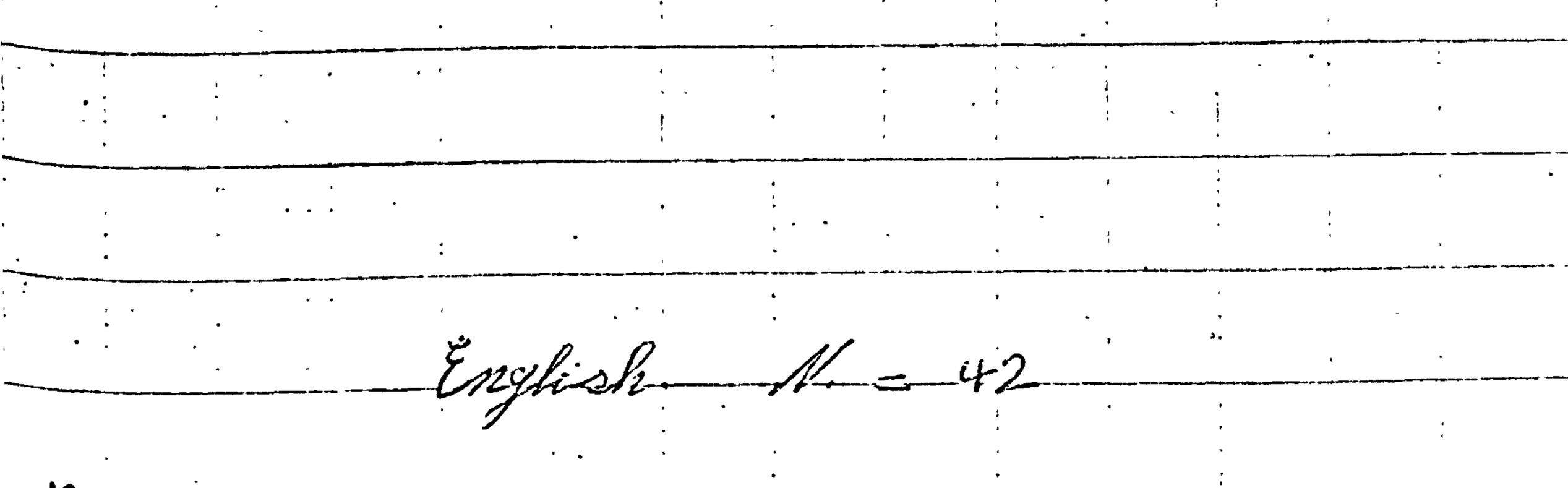


TABLE 13

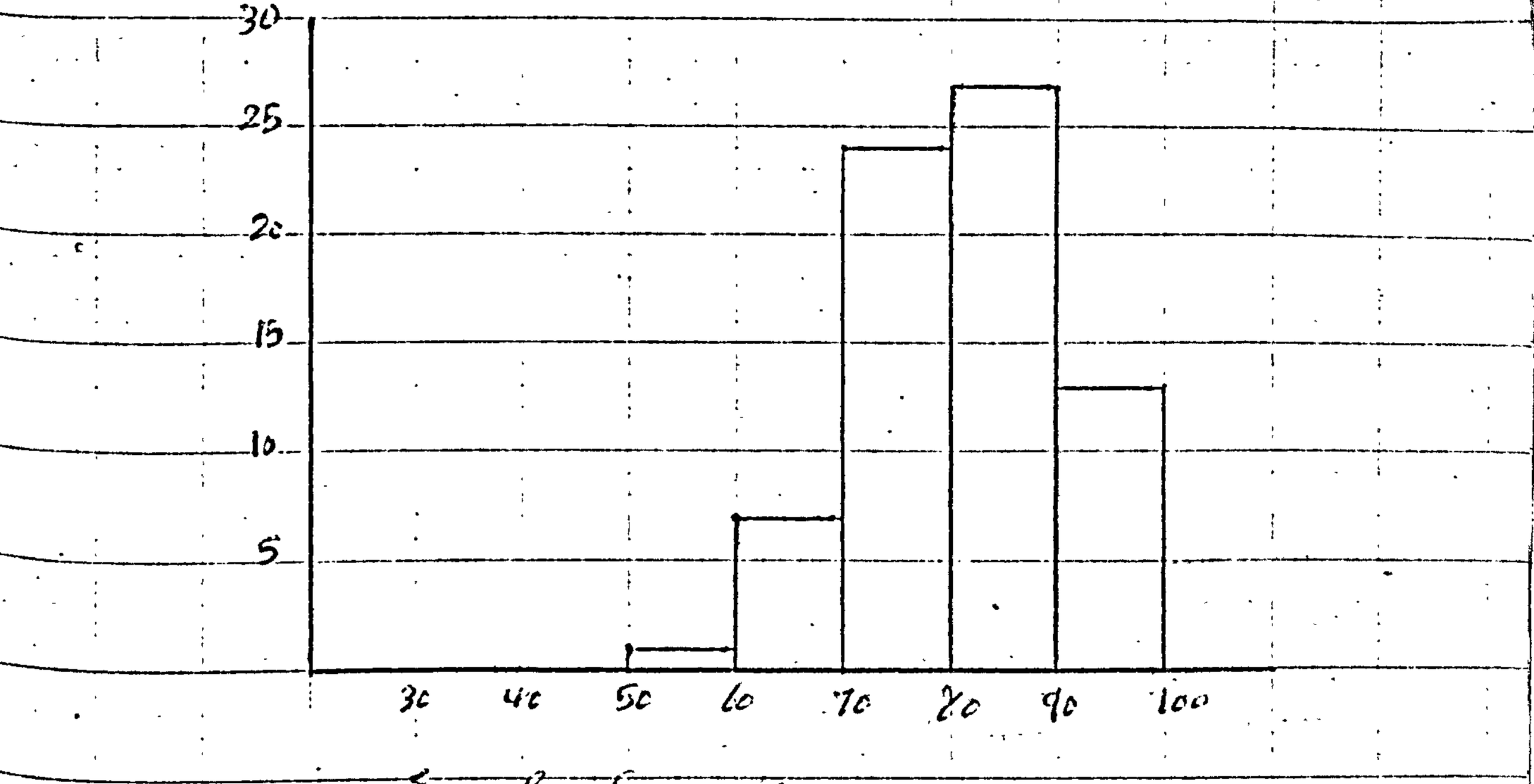
Frequency Distribution of Fourth-year Students' Scores on the Reading Test as a Whole

	Intervals	Med. & Engin.	Sciences	Total	Arts	Educ.	Total	Social Studies
English	91-100	4	-	4	-	-	-	-
	81-90	16	6	22	-	-	-	2
	71-80	12	9	21	5	5	10	-
	61-70	5	7	12	5	4	9	1
	51-60	1	8	9	3	5	8	6
	41-50	-	4	4	1	2	3	11
	31-40	-	-	-	-	-	-	11
	20-30	-	-	-	-	-	-	11
	N.	38	34	72	14	16	30	42
	Mean	74.52	61.56	68.40	60.36	56.68	58.40	35.45
	S.D.	8.79	8.60	12.67	10.90	10.24	10.54	10.54
Arabic	91-100	8	5	13	-	-	-	-
	81-90	15	12	27	6	1	7	6
	71-80	11	13	24	3	5	8	13
	61-70	3	4	7	3	8	11	16
	51-60	1	-	1	2	2	4	7
	41-50	-	-	-	-	-	-	-
	31-40	-	-	-	-	-	-	-
	20-30	-	-	-	-	-	-	-
	N.	38	34	72	14	16	30	42
	Mean	81.58	79.21	80.46	74.57	67.19	70.63	68.24
	S.D.	10.28	8.60	9.53	9.39	8.38	9.48	8.89

Figure 16.

Fourth Science Reading Test As A Whole

Arabic. N. = 72



English. N. = 72

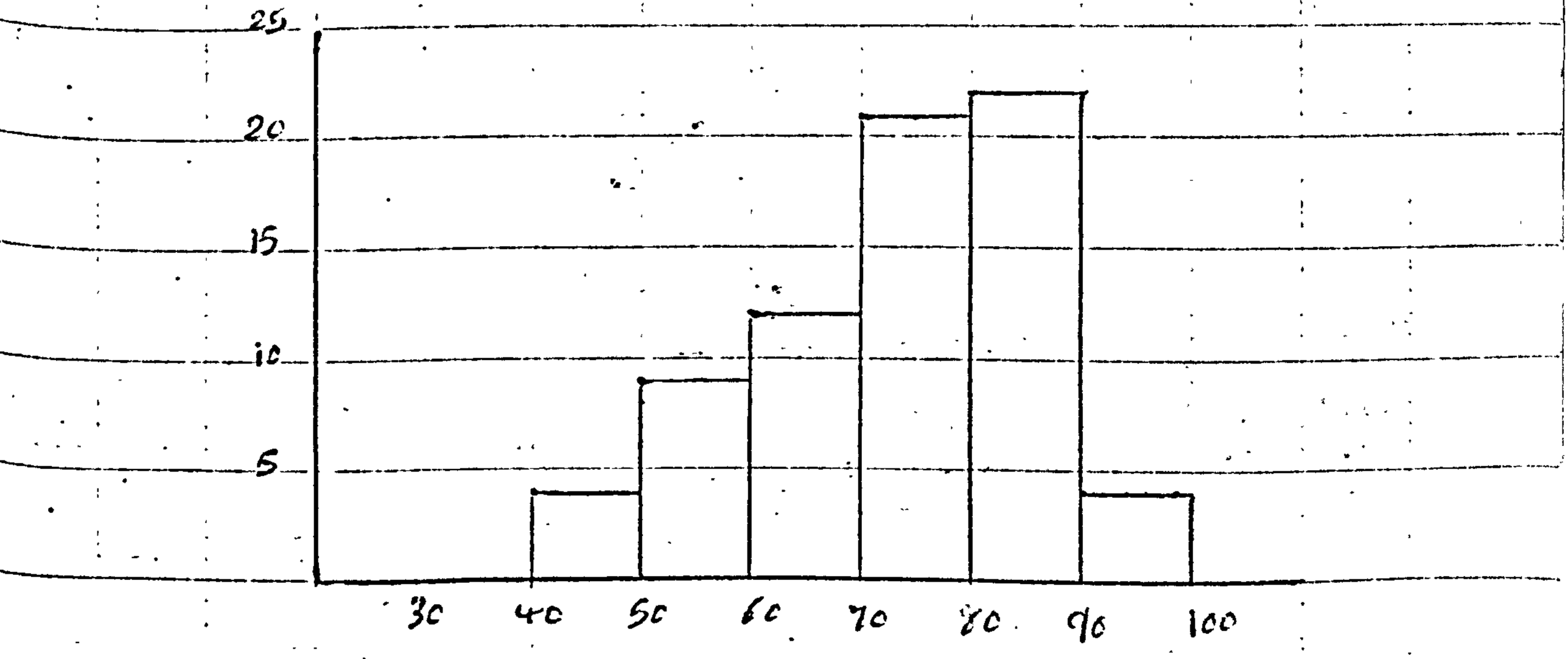
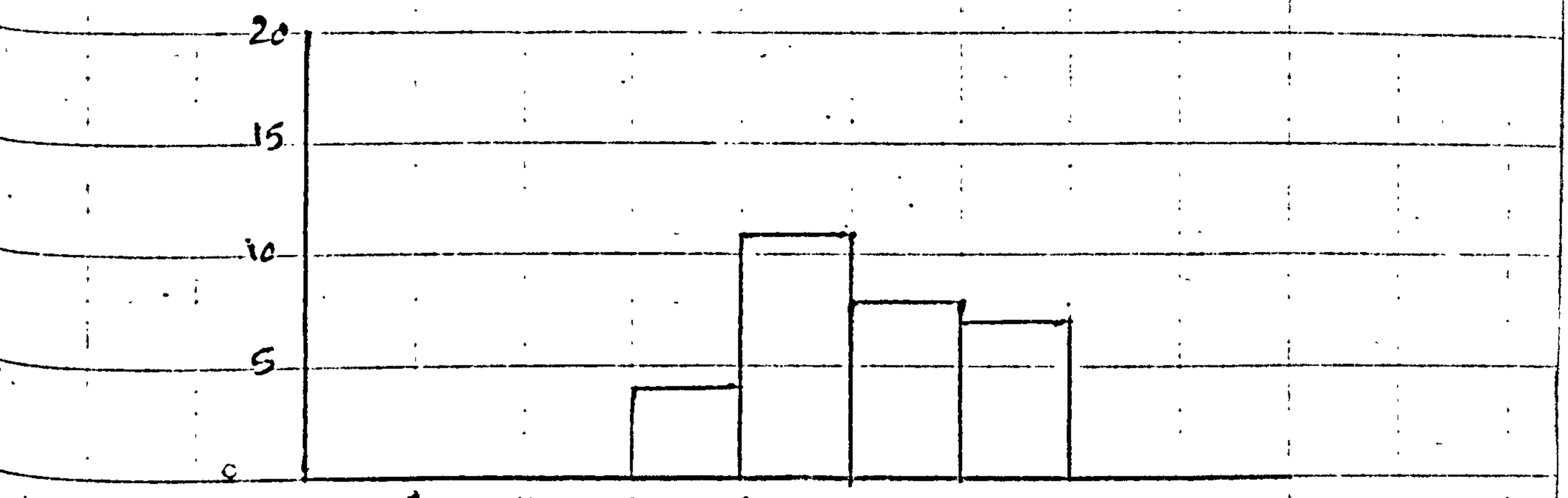


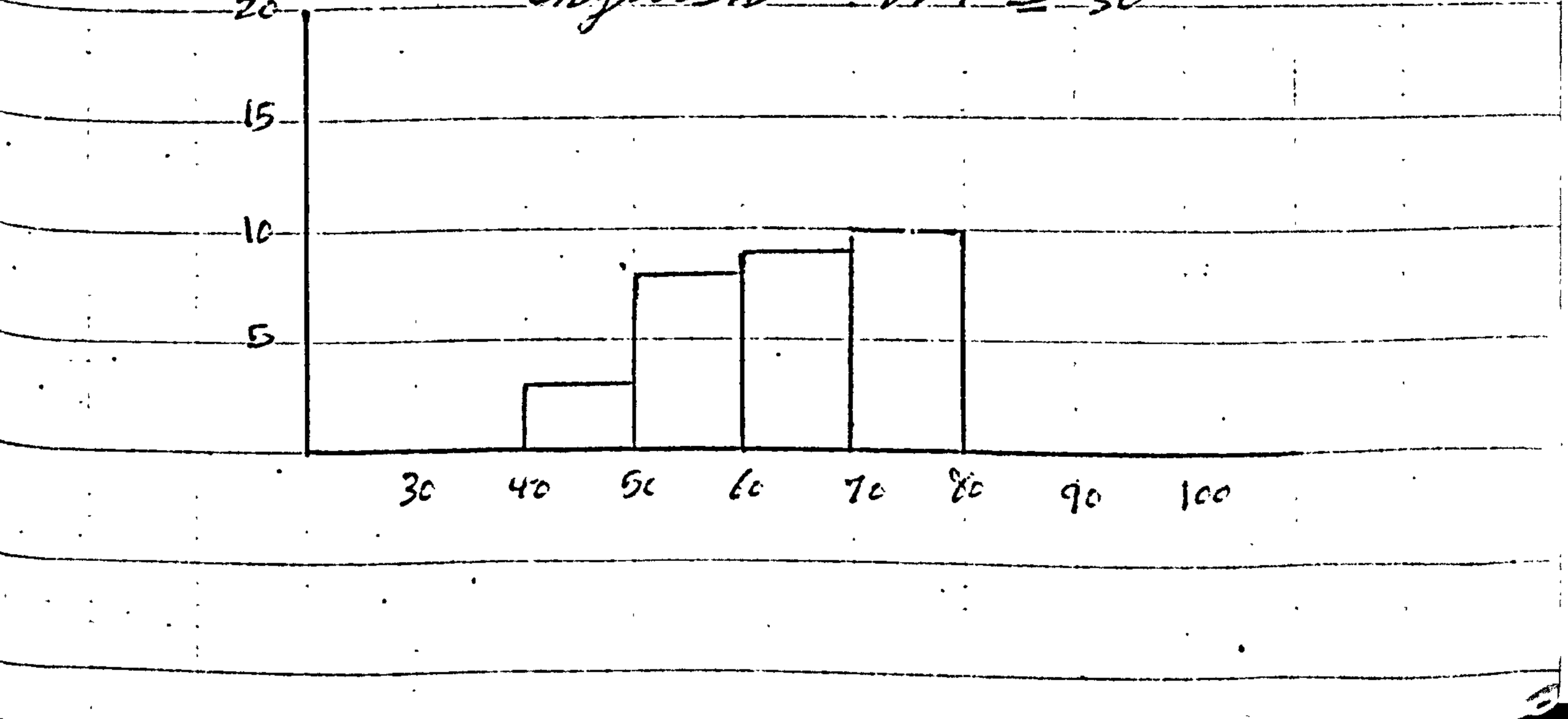
Figure 17.

Fourth Arto Reading Test As A Whole

Arabic. N. = 30

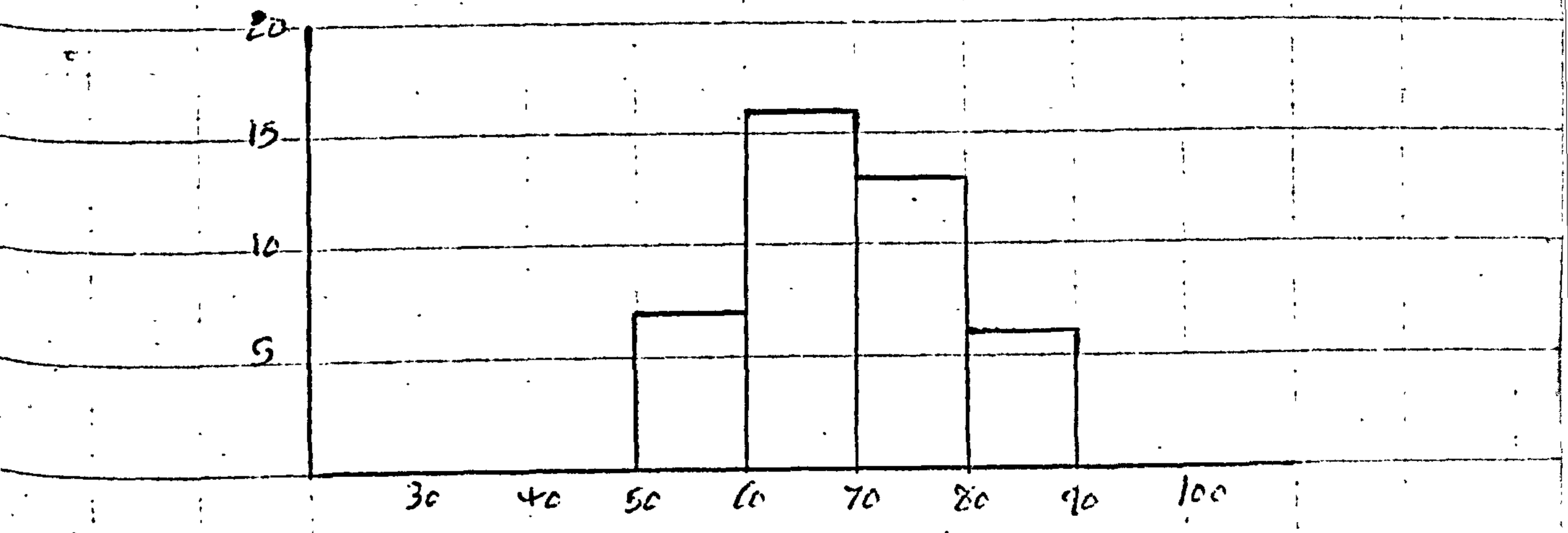


English N. = 30



Fourth Social Studies Reading Test As A Whole

Arabic N. = 42



English N. = 42

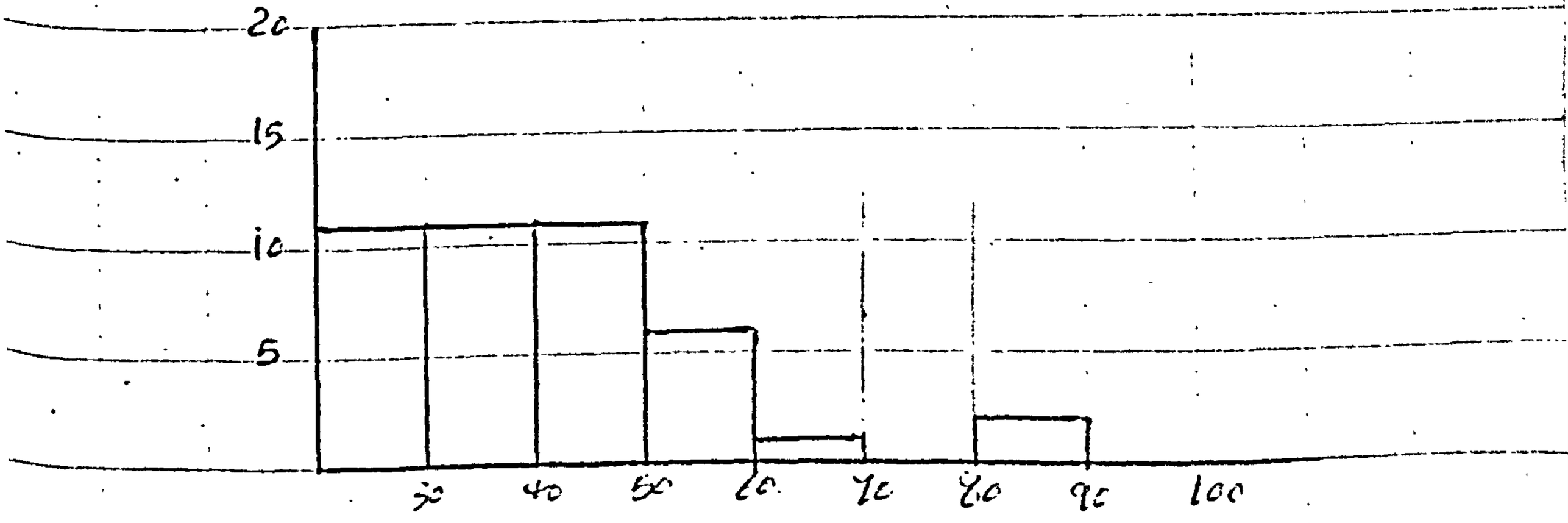


TABLE 14

Percentage of General Ideas Recognition of what is Read in a Minute, for First-year Students, in English

Words per Minute	Percentage of Recognition																																				Mean %
	100	94	91	88	86	83	80	79	78	75	71	67	66	65	63	62	60	57	52	50	47	45	44	43	40	39	38	33	29	26	25	20	16	14	13	11	0	
138	1			8						3					7	1				1							5				2				1		1	61.2
122			1						6		1			3					3						1				1			1					62.5
105					4					3	7							4				1		2					1					2			1	59.1
94		1						1							1						1		1						1									59.0
82	1					4					1	5	1							7							4								1			58.2
64	2					1	4										7								8						1					1	56.8
48	1						1			5		1					1			1										3		1					58.8
30												1															1									1	33.3

N = 143

Mean W.P.M. 95.59

Mean of Recog. 56.11

TABLE 15

Percentage of General-Ideas Recognition of what is read in a Minute, for First-year students in Arabic

Words per Minute	Percentage of Recognition																									Mean %
	100	88	87	86	85	83	78	75	71	65	63	62	57	52	50	43	40	38	29	28	25	20	17	13	0	
222	4	10	10					23			14	8			8			4			1			1	1	68.9
192							5		1	4			3	3				1								63.9
163				9	1				9				4			3			1							67.7
144																					1					25.0
126	2				2										2								1			66.0
109	1		1																							94.0
91	2															1						2				52.4

N = 143

Mean of W.P.M. 195.88

Mean of Recog. 62.5%

TABLE 16

Percentage of General-Ideas Recognition of What is Read in A Minute, for Fourth-year Students, in English

Words per Minute	Percentage of Recognition																																					Mean %
	100	94	91	88	86	85	83	80	81	79	78	75	71	69	67	66	65	63	62	60	57	52	50	47	45	40	39	38	32	30	29	26	25	20	17	14	11	0	
138	1			4							1	10						1	6				8					2					5					1	56.6
122											3						2	1									1					1							61.5
105						5							16								8										6								62.8
94	1	1							1	1								2											1									1	64.0
82	2						1		6					3	2								1						1					2	2				53.4
64	6							5												4			1			4								2					63.2
48												5											2									1						1	67.7
30															1																								67.0

N = 144

Mean of W.P.M. 101.18

Mean of Recog. 62.01

TABLE 17

Percent of General-Ideas Recognition of what is Read in a Minute, for fourth-year students, in Arabic

Words per Minute	Percentage of Recognition																															Mean %
	100	91	88	87	86	85	83	80	79	78	75	74	71	70	67	65	64	63	62	60	57	52	50	45	43	40	39	38	28	25	20	17	
222	4		8								28							20					15					14		1			71.1
192		1										2					3	1				4					1						61.8
163	1				7								10								6				3				3			65.6
144													1																		1	48.5
126	2											3																				83.4
109																																
91	2											1																				93.3

N = 144

Mean of W.P.M. 198.73

Mean of Recog. 70.1%

Correlation between Arabic and English Versions of Test

> "No single statistical procedure has opened up so many new avenues of discovery in psychology, and in behavioural science in general, as that of correlation. This is understandable when we remember that scientific progress depends upon finding out what things are correlated and what things are not." 1

As the aim of this investigation was to find out the relationship between the ability of students, at Baghdad University, in the skills of reading English and those of reading Arabic, correlation was used as a third method of presenting, summarizing, and interpreting the data at hand. A coefficient of correlation, though a single number, like many other statistical devices, implies detailed explanations. A coefficient of correlation, as Guilford puts it, "tells a story". The figure obtained from a coefficient of correlation indicates the degree of relationships between two items, two tests, two subjects, or two abilities. It demonstrates distinctly and accurately the extent to which one variable is related to the other. For example, if the degree of relationship between two subjects is known and the value of improvement of one of them, after training, is also obtained, then the degree of improvement of the second subject can be predicted.

In this investigation, the coefficients of correlations serve as an additional item of evidence to illustrate that the students good at reading

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1. Guilford, J.P., 1965, p.91.

Arabic are also good at reading English and vice versa. From this, it can be concluded that if a student is trained to read English better, he will, therefore, read Arabic better than he used to.

The first correlation for 32 variables in English and 32 variables in Arabic, for a group of first-year students and three groups of fourth-year students, were computed by the Institute of Computer Science, University of London, using the product-moment method. "The product-moment coefficient 'r' is a precise mathematical statement of the relationship between two such sets of scores."[1] Being the most common, the product moment coefficient is given below:

$$r = \frac{\Sigma dx \quad dy}{N(SD_x)\ (SD_y)}$$ [2]

Its use provided a summary of the relationship between the students' scores on the Arabic test and their scores on the English. The results are shown in the tables below. The speed-recognition results and the comprehension tests data are tabulated, each separately, in the following tables.

Tables 18, 19, 20 and 21 present the relationship between corresponding items of the speed recognition test in Arabic and in English. The

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1. Tyler, L.E., 1963, p.19.

2. The writer used this formula as a provisional computation of the correlations of the total scores in English and in Arabic.

relationship between the comprehension test items in Arabic and in English is exhibited in Tables 22, 23, 24 and 25. The relationship between the reading test as a whole (speed-recognition and comprehension) in Arabic and in English is also shown in Tables 22-25.

Table 18 summarizes the correlation coefficients of the first-year data. While none of the coefficients of correlation for the pairs of items is significant, nevertheless the correlation between the total of the recognition items and the total of the speed-recognition items is significant. ($r = .18$, $p < .05$)

To reduce the diversity of the fourth-year students, and to avoid the undue increase in the size of r,[1] it was decided to compute the correlation coefficient of each fourth-year group separately.

Table 19, which exhibits the relationship between the Arabic and the English speed-recognition test-items of the fourth-year Science group, shows only one significant figure, out of the eleven coefficients of correlations. Item number nine's coefficient of correlation is significant at the .05 level ($r = .27$).

Table 20, which presents the coefficients of English-Arabic item inter-correlation for the fourth-year Arts, reveals no single significant coefficient of correlation.

Table 21, where the coefficients of correlations for the fourth-year Social Studies group are summarized, shows that the correlation coefficient of item 7, which is negative, is the only significant one ($r = -.36$, $p < .05$).

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1. Vernone, P.E., 1940, p.140.

This is difficult to explain.

A further examination of the tables reveals some negative correlation coefficients, but these coefficients are not significant.

From what has been said above, it is quite clear that increase of speed in Arabic is not followed by increase of speed in English. And the improvement of the recognition skill of one of the languages is only little effected by the improvement of the recognition ability of the other.

The absence of relationship between the Arabic and the English rate of reading is due, to a great extent, to the students' habits of articulating words read silently in the same manner that words are articulated in oral reading. Arabic words are shorter than English words. It follows, then, that less time is needed to articulate Arabic words than English words. Had the students been trained not to articulate words in silent reading, the relationship between the Arabic and the English speed of reading would have been moderately high.

It is probable that the low correlation coefficient between the Arabic and the English recognition test, shown in Table 18, may be explained by the fact that Iraqi students are less familiar with the English every-day vocabulary than with the Arabic every-day vocabulary. It is likely that for the same reason the correlation coefficients in Tables 19, 20 and 21 are almost zero. Lack of familiarity with the English every-day vocabulary seems enough reason to explain the low correlation coefficients between the result of the Arabic-English recognition tests.

TABLE 18

Inter-Correlation of English and Arabic Item-Scores of Speed-Recognition Tests for First-year Baghdad University Students

No. in Sample 143	No. of Items	English S. 1	2	3	4	5	6	7	8	9	R.T.	R.T.&S.
Arabic	S. 1	0.10										
	2		0.11									
	3			0.09								
	4				0.08							
	5					0.05						
	6						-0.01					
	7							0.14				
	8								0.01			
	9									-0.04		
	Rec.T.										0.18	
	Rec. & S. Total											0.18

TABLE 19

Inter-Correlation of English and Arabic Item-Scores of Speed-Recognition Tests for Fourth-Year Sciences

No. in Sample 72	No. of Items	English										
		S. 1	2	3	4	5	6	7	8	9	Rec. T.	S. & Rec. T.
Arabic	S. 1	0.03										
	2		0.05									
	3			0.13								
	4				-0.17							
	5					-0.06						
	6						-0.07					
	7							-0.15				
	8								-0.01			
	9									0.27		
	Rec. Total										0.13	
	Speed & Rec. Total											0.19

TABLE 20

Inter-Correlation of English and Arabic Item-Scores of Speed-Recognition Tests for Fourth-Year Arts

No. in Sample 30	No. of Items	English										
		S.1	2	3	4	5	6	7	8	9	Rec.T.	S.& Rec.T.
Arabic	S. 1	0.11										
	2		0.07									
	3			-0.00								
	4				-0.10							
	5					-0.05						
	6						0.14					
	7							-0.15				
	8								-0.24			
	9									0.27		
	Rec. Total										0.03	
	Speed & Rec. Total											0.16

TABLE 21

Inter-Correlation of English and Arabic Item-Scores of Speed-Recognition Tests for Fourth-Year Social Studies

No. in Sample 42	No. of Items	English										
		S.1	2	3	4	5	6	7	8	9	Rec. T.	S.& Rec.T.
Arabic	S. 1	0.06										
	2		-0.20									
	3			-0.04								
	4				-0.11							
	5					-0.02						
	6						-0.12					
	7							-0.36				
	8								0.03			
	9									0.16		
	Rec. Total										0.07	
	Speed & Rec.Total											0.15

One turns with interest to the Arabic and English comprehension items and tests to see if similar relationships to those of the speed-recognition group are found.

For the first-year students, as is shown in Table 22, most of the inter-correlation coefficients of Arabic and English comprehension items are statistically significant. Some are highly significant; some are moderately significant; and some have low levels of significance. Item 3, one of the two items with significantly low correlation coefficients, has a negative coefficient ($r = -.22$). And the correlation coefficients of items 1,2,4,5, 8 and 15, 16 and 17 are not significant at all.

In spite of the low significance of the correlation coefficient of some of the single-item correlations, which are mentioned above, the correlation coefficient of the total of the comprehension test, which is composed of three passages and 15 items, is of high magnitude ($r = .77$, $p < .01$). With the exception of the correlation coefficient between the totals of the 5 questions of reading passage one in the two languages, which is .18, $p < .05$, the correlation coefficients of the totals of the questions of selections 2 and 3, being .43, $p. < .01$ and .45, $p < .01$ respectively, are moderately significant.[1] The correlation coefficient of the English-Arabic intercorrelation of the reading test as a whole (speed and recognition and comprehension) is high ($r = .65$).

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1. The interpretation of the correlation depends on the size of the sample.

A more detailed examination of Table 22 reveals that the correlation coefficients of the Arabic-English intercorrelations of items 7, 9, 10 and 13, which stand for a very simple inferential answer and three inferential answers respectively, are significant at 0.1 level. The correlation coefficient of item 14 (r = .21, significant at the .05 level) represents an answer found directly in the reading passage. Item 3, which has a negative coefficient of correlation (-.22), is also representing a very easy inferential answer. The negative correlation coefficient means that low score in comprehending one of the languages - English or Arabic - is followed by high score in comprehending the other, which is not easy to explain.

It is both significant and interesting to conclude that: 1) Relationship between the English and Arabic comprehension items occurs only when the interpretation deals with ideas expressed in a straightforward way in a reading text; 2) There is no relationship between the Arabic and the English highly or fairly inferential answers; 3) The relationship between totals of the Arabic form and the English form of the comprehension test, in particular, and the reading test as a whole, in general, is strong, for the first-year group.

The result of the English-Arabic intercorrelation of comprehension items for the fourth-year Science group is presented in Table 23.

Only seven, out of 20, correlation coefficients are statistically significant. The 13 items, whose correlation coefficients are near zero, are, then, independent. The significant coefficients in most cases are high. The highest value of r, being .83, is attached to the total of the comprehension

items. The second high coefficient of correlation is the correlation of the two forms of the reading test as a whole. Two of the remaining five significant correlation coefficients ($r = .48, p < .01$, and $r = 35$, $p < .01$) relate to the totals of the items of reading passages 2 and 3 respectively.

Item number 9 ($r = .51$, $p < .01$) represents a fairly inferential answer; while items number 15 and 16 ($r = .27$, $p < .05$, and $r = .29$, $p < .05$) stand for inferential answers. The two forms of each comprehension item according to their definition in Chapter IV, are testing the same ability of reading in both the languages. Hence, a reasonable conclusion from these intercorrelations is that the comprehension ability, in general, in reading Arabic is strongly related to the comprehension ability of reading in English.

The intercorrelations of the English and the Arabic comprehension items for the fourth-year Arts Group are tabulated on page 240.

With the exception of the correlation coefficient of item number 2 (where $r = .76$), which is a measure of the students' ability to supply a highly inferential answer, the only significant values relate to the totals. The highest correlation coefficient is that between the two versions of the comprehension test ($r = .90$), which is the total of 15 items. Another high value is shown by the correlation coefficient of the reading test as a whole, where r equals .70. The correlation coefficients of the totals of the reading passages number 1, 2, and 3 are .44, .45 and .43 respectively. These latter coefficients are significant only at the .05 level.

Table 25, where the fourth-year Social Studies' correlation coefficients

are shown, contains seven significant values. Five of them are significant at .01 level, and two are significant at the .05 level. The highest among them is .86, the correlation coefficient of the comprehension test. The next six in descending order correspond to the reading test as a whole (r = .78); the coefficient of the total of the five questions of the last reading passage (r = .61); the correlation coefficients of items 15 and 1 (r = .57 and .49) which are highly inferential; and the correlation coefficients of items number 6 and number 11 (r = .38 and .34, $p < .05$) which are items of an inferential nature.

Three very important conclusions may be drawn from the fourth-year tables of correlations: 1) The correlation coefficients of the comprehension tests are highly significant for all the groups. 2) A significant relationship exists between the Arabic totals and the English totals. 3) Questions devised to measure the ability of the students to provide inferential answers are closely related in Arabic and in English. Accordingly, it can be said that the advanced reading skills in Arabic and in English are highly related to each other as revealed by the reading of only the fourth-year students.

From the evidence available, it can be concluded that the abilities of the Baghdad University students in comprehending English should be improved by improving their abilities to comprehend Arabic, and it follows that it is likely that the comprehension improvement of the students reading English will have an active effect on the improvement of their comprehension when reading their mother-tongue, Arabic.

TABLE 22

Inter-Correlation of English and Arabic Item-scores of Comprehension Test for First-Year Baghdad Uni. Students

(Abbreviations used are the same in the following 3 tables)

	No. in Sample 143	No. of Items	English																			
			1	2	3	4	5	T. 6	7	8	9	10	11	T. 12	13	14	15	16	17	T. 18	T.C 19	G.T. 20	A. 21
Arabic		1	-.07																			
		2		-.02																		
		3			-.22*																	
		4				.11																
		5					.03															
		6T.						.18*														
		7							.28**													
		8								.05												
		9									.28**											
		10										.28**										
		11											.19*									
		12T.												.43**								
		13													.26**							
		14														.21*						
		15															.13					
		16																.08				
		17																	.12			
		18T.																		.45**		
		19T.C.																			.77**	
		20G.T.																				.65**
		21A.																				

T. = Total of above 5 items. T.C. = Total of Comprehension G.T. = Grand Total = Comprehension + Speed-Recognition test.

N = 143. * Significant at .05 level. ** Significant at .01 level. A = Academic Score

TABLE 23

Inter-Correlation of English and Arabic Item-Scores of the Comprehension Test
Fourth-year Sciences

No. in sample 72	No. of items	English 1	2	3	4	5	T. 6	7	8	9	10	11	T. 12	13	14	15	16	17	T. 18	T.C. 19	G.T. 20	A. 21
Arabic	1	.12																				
	2		-.01																			
	3			.02																		
	4				-.06																	
	5					-.05																
	6T.						.14															
	7							.17														
	8								.20													
	9									.51**												
	10										.14											
	11											-.07										
	12T.												.48**									
	13													.19								
	14														-.06							
	15															.27*						
	16																.29*					
	17																	-.06				
	18T.																		.35**			
	19T.C.																			.83**		
	20G.T.																				.66**	
	21 A.																					.59**

N = 72. * Significant at .05 level. ** Significant at .01 level.

TABLE 24

Inter-Correlation of English & Arabic Item-Scores of Comprehension Test for Fourth-Year Arts

No. in sample 30	No. of Items	English 1	2	3	4	5	T. 6	7	8	9	10	11	T. 12	13	14	15	16	17	T. 18	T.C. 19	G.T. 20	A. 21
	1	.24																				
	2		.76**																			
	3			-.32																		
	4				.25																	
	5					.25																
	6T.						.44*															
	7							.14														
	8								.15													
	9									.07												
Arabic	10										-.20											
	11											.11										
	12T.												.45*									
	13													.15								
	14														.29							
	15															.35						
	16																.22					
	17																	.11				
	18T.																		.43*			
	19T.C.																			.90**		
	20G.T.																				.70**	
	21A.																					.71**

N = 30. * Significant at .05 level. ** Significant at .01 level.

TABLE 25

Inter-Correlation of English and Arabic Item-Scores of the Comprehension Test for Fourth-Year Social Studies

	No. in Sample 42	No. of Items	English																			
			1	2	3	4	5	6 T.	7	8	9	10	11	12 T.	13	14	15	16	17	18 T.	19 T.C.	20 G.T.	21 A.
Arabic		1.	.49**																			
		2		.19																		
		3			.00																	
		4				.21																
		5					.07															
		6T.						.38*														
		7							.26													
		8								.28												
		9									-.08											
		10										-.16										
		11											.34*									
		12 T.												.29								
		13													.16							
		14														-.01						
		15															.57**					
		16																.24				
		17																	-.04			
		18T.																		.61**		
		19T. C.																			.86**	
		20G. T.																				.78**
		21 A.																				

N = 42. * Significant at .05 level. ** Significant at .01 level.

Item Analysis

So far the statistical treatment has dealt with test and sub-test totals on the assumption that items are all appropriate (i.e. consistent) and may be totalled to give meaningful test scores.

Tables 26 and 27 below show the percentages of success and failure in each item of the comprehension tests for the first-year and the fourth-year students. As it was thought that these tables of percentages might prove very useful, they were used as a fourth method to analyse the present data.

A careful study of the tables serves two important purposes: 1) they confirm the suitability of the names, such as simple, complex[1], inferential, highly inferential, etc., which are given to each comprehension item. 2) They indicate evidently the level of the students' abilities in reacting to the different types of questions on the three reading passages for each group.

Table 26 reveals the great variability in the first-year students' reaction to different kinds of questions. They show great ability in answering questions whose answers could be seen on a printed page. They are, for example, quite capable of answering a question put on the following sentence:

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1. The decision whether the recognition items were simple or complex was based on some authorities' opinions, and the items' means and standard deviations obtained while computing the correlation between English and Arabic Items. Their tabulation here was thought not to be necessary.

Mary's coat is white.

Whose coat is white?

Mary's.

And in Table 26 it is clear the line of demarcation of what these students are able to understand and what they are not. All the items which were answered 90% and above correctly were questions devised to test literal comprehension; but this is not reading by university standards.

> "'Barking at print' even when accompanied by a correct bark at questions designed to test literal comprehension, is psychologically a very different performance from an act of reading that includes the 'response-to-message', a factor which is of paramount importance in the performance of a mature reading." 1

A close survey of Table 27 shows that even the fourth-year university students 'bark at print'. Eighty three per cent of the Arts group failed to answer item two, which in order to be answered requires deduction from what is read, in both Arabic and English. The Science group did not show such a poor comprehension of any of the items either because their reading material is not as highly inferential as a piece of literary work is, or because they are more intelligent, or both. The Social Studies group showed a very poor understanding of nearly all the English items; but only the inferential items in the Arabic test received poor interpretation.

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1. Morris, R., 1965, p.72.

TABLE 26

First-Year Percentages of Success and Failure

	Total	Number of Items														(later numbered
	143	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	10 - 24)
English	Items ans. corr.	68	87	134	85	133	124	41	76	76	132	109	48	54	126	67	
	% Success	48	61	94	59	92	87	29	53	53	92	76	34	31	88	47	
	% Fail.	52	39	6	41	8	13	71	47	47	8	24	66	69	12	53	
Arabic	Items ans. corr.	110	119	142	129	141	141	85	104	120	141	140	86	71	138	103	
	% Success	77	83	99	90	98	98	59	73	81	98	98	60	50	96	72	
	% Fail.	23	17	1	10	2	2	41	27	19	2	2	40	50	4	28	

Fourth-Year Percentages of Success and Failure

	Group	No. of Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
English	Sciences	72	52	56	60	68	68	68	43	52	56	66	55	66	45	50	65
		%S	72	78	83	94	94	94	58	72	78	91	76	91	62	69	90
		%F	28	22	17	6	6	6	42	28	22	9	24	9	38	31	10
	Arts	30	10	5	18	23	11	11	25	16	26	17	9	26	20	21	26
		%S	33	17	60	76	36	36	83	53	86	56	30	86	66	70	86
		%F	67	83	40	24	64	64	17	47	14	44	70	14	34	30	14
	Social Studies	42	4	7	21	10	19	31	12	10	32	12	15	10	3	2	3
		%S	9	16	50	23	45	73	28	23	76	28	35	23	7	5	7
		%F	91	84	50	77	55	27	72	77	24	72	65	77	93	95	93
Arabic	Sciences	72	53	58	61	68	69	68	48	40	57	68	60	69	60	65	70
		%S	73	80	84	94	96	94	66	55	79	94	83	96	83	90	97
		%F	27	20	16	6	4	6	34	45	21	6	17	4	17	10	3
	Arts	30	13	5	26	26	17	6	27	14	24	16	19	28	24	24	28
		%S	43	17	86	86	56	20	90	46	80	53	63	93	80	80	93
		%F	57	83	14	14	44	80	10	54	20	47	37	7	20	20	7
	Social Studies	42	13	21	38	26	39	39	30	32	39	11	36	38	8	20	17
		%S	30	50	90	61	92	92	71	76	92	26	85	90	19	49	40
		%F	70	50	10	39	8	8	29	24	8	74	15	10	81	51	60

(later numbered 10 - 24)

S = Success
F = Failure

From the facts thus obtained, it can be said that these students were not trained to read, and did not develop the habit of reading, for the meaning behind the words. Had they been given a test, the answers to whose questions were all inferential, their scores would have been drastically low.

A word may be in order here about punctuation:

> "Punctuation aims to keep him out of the traffic jam that occurs when words follow too closely upon one another and when one thought swerves into the path of another thought without due warning or sufficient pause." 1

Arabic writing, apart from the very modern and translated books, lacks this guiding device. Lack of familiarity with the English pronunciation system could be a serious cause of the students' inability to form a direct bond with what they read. Apparently they do not make use of the clues provided by punctuation in comprehending what they read.

Item Consistency

So far we have not demonstrated that items assigned to sub-totals belong together. The normal method (e.g. biserial correlation) has not been used here to demonstrate item consistency because the component analysis which has been used later to consider other hypotheses can also be used as an empirical demonstration of item consistency.

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1. Leedy, Paul D., 1956, p.106.

Summary

The following significant facts were revealed by the analysis of results:

1) Absence of significant differences between the mean scores of most of the students' reading skills in English and Arabic.

2) Baghdad University students are inefficient readers. Their reading achievement is below their educational standard in both English and Arabic. They read slowly and comprehend inadequately. Their comprehension of inferential items is relatively poor.

3) The difficult and easy items in the English tests are relatively difficult and easy in the Arabic tests.

4) Strong relationships exist between the general reading abilities in the two languages.

5) Totals of comprehension items, and totals of items in each passage are always correlated highly or moderately. Individual items, mostly of comprehension, are occasionally correlated also.

CHAPTER VIII

COMPONENT ANALYSIS

> "An ability or factor should be thought of as a class or group of performances, and it should be admitted only if a number of measurements in this class (e.g. test results) overlap or correlate possitively with one another." 1

'Component Analysis' is a method psychologists invented and used to explore varieties of mental abilities. This technique has been used to analyse tables of correlations between test scores in order to reduce a large number of test results to a few underlying common factors by illuminating what different tests have in common. Hence, it is very important to bear in mind that "factorial investigations are not revealing the elements out of which the mind is compounded, but are classifying test performances with a view to predicting more effectively other performances."[2] The method was used in this study to determine internal consistency of sub-tests which have been assumed to form cohesive groups of items.

Various methods of factorial investigations have been in use, but their discussions were out of the scope of the present work. Besides, they had been already discussed by eminent mathematicians and psychologists like

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1. Vernon, P.E., 1950, p.1.
2. Vernon, P.E., 1940, p.169.

Burt (1940),[1] Cattle (1953),[2] Guilford (1954),[3] Harman (1960),[4] Holzinger and Harman (1941),[5] Lawley and Maxwell (1963),[6] Solomon (1960),[7] Thurstone (1947),[8] and Vernon (1961).[9] Lawley and Maxwell prefer to distinguish factor analysis and component analysis, but though the aims of the methods are different the results are usually similar.

The method of principal components was adopted in this investigation. 'Principal Components', though mathematically complicated, was thought to be the most suitable technique, because of its popularity and the availability of computer services. C. Burt always claims that Karl Pearson "invented" the method in 1901, but the methods were too cumbersome. Hotelling touched up the process and published accounts of the iterative methods of solution which eventually became computerized.

The sub-tests (items) of reading abilities were submitted to component

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1. The Factors of the Mind, London, U.L.P.
2. Factor Analysis, New York, Harper.
3. Psychometric Methods, New York, McGraw-Hill.
4. Modern Factor Analysis.
5. Factor Analysis, Chicago, The University.
6. Factor Analysis as a Statistical Method.
7. Multiple Factor Analysis.
8. Factorial Analysis of Human Ability.
9. The Structure of Human Abilities.

analysis because:

1) "Any psychological test, or measure of scholastic or occupational ability, can be regarded as being made up of some of these factors, or as possessing a certain 'factor pattern'."[1]

2) "... no test measures nothing but 'g' and a specific factor, since the type of test material employed always introduces some additional common element."[2]

The sub-tests of the reading test were regarded as specific tests for purposes of component analysis. Each received treatment as a separate one to safeguard against the risk of masking the components since the results of the analysis of variance and 't' test showed the negative correlation between some items of the English form against some other items of the Arabic form of the test.

The two forms of the test - English and Arabic - and the four groups of students were considered separately. It was decided that the analysis of the internal structure of the two matrices of intercorrelations in each group should include the twenty-four sub-tests (items) plus the total mark of the test as a whole and the average of the academic marks of the students (the leaving school average mark for the first-year students, and the third year examination average mark at the University for the fourth-year students).

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1. Vernon, P.E., 1940, p.159.
2. Ibid., p.167.

Theoretically twenty-six components could be extracted, according to the American psychologists, from the correlation matrices. Following the advice of the Computer Unite advisory department - Institute of Computer Science, University of London, who carried out the analysis - ten components were computed. According to Vernon[1] there was no point in computing more components, since "The residual coefficients, which are left after a general factor and some group factors have been extracted, are so small relative to their P.E.S., that it is not worth while analysing them further." Moreover, Vernon in his article, "An Application of Factorial Analysis to the Study of Test Items",[2] considered a factor accounted for 3.3% of the variance close to the borderline of significance and he stopped extracting factors after that. He also stated that his practice is "to regard a factor as significant if half the loadings exceed 2XS.E."; while Guilford and Lacy's approximate test of significance for a factor is that the product of the two highest loadings should exceed the S.E. of zero r. The formula used is: $1/\sqrt{N}$ where N = the number of persons.

Following this criterion, extraction of components was stopped after the tenth which was also close to the borderline of significance.

The components were rotated by Varimax method.[3] A close examination

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1. Ibid., p.197.
2. B.J. Psychol., Stat. Section, 1950, p.5.
3. The rotation was performed by the computer, the Institute of Computer Science, University of London.

of the unrotated components' loadings made it quite clear that some educational meaning could be attributed to them. Yet a brief reference to the rotated components is to be made, since they may add more meaning to the analysis of the components.

Interpretation of the Components

First-Year Group (English and Arabic Components)

The table below presents the unrotated component loadings of the first-year University students on the English form and the Arabic form of the test. A description of the percentage of variance accounting for each component is also found. The significant loadings (values equal to .30 and more)[1] are shown by an asterisk. And, according to Harman's[2] method of the proportions of the total variance, the proportion of the total variances in this analysis, which were 71.08 and 68.34, seemed quite reasonable.

In the following descriptions of components, loadings exceeding 0.20 are listed; but in interpreting the nature of the components loadings of .30 and more are taken into account only. For the conformation of the components, smaller loadings could be of interest. Moreover, if they appear in the English and Arabic version simultaneously, they could be of great help in understanding differences between the students' reading abilities in English and Arabic.

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1. Suggested by Vernon, P.E., 1961.
2. 1960.

The interpretation to follow has leaned heavily on assuming that successful performance of the various items require skills differing in complexity. They may also require varying degrees of speed or recognition.

Component 1[1]

English: This component accounts for the largest share (24.20%) of the variables' variance. All the loadings are positive and either moderately high or highly significant with the exception of the loadings of items numbers 3 and 10. The highest loadings are the total of the reading test (.98) and the average of the students' academic marks (.77).

The next highest loadings of the speed-recognition test are loadings of items 8 (.52, complex), 9 (.50, very complex), 1 (.49, speed), 7 (.47, simple), 6 (.45, very complex), 5 (.43, complex), 4 (.30, very simple), and 2 (.30, complex).

The rest of the comprehension item loadings in order of magnitude are: 17 (.66, inferential answer), 18 (.63, inferential answer), 21 (.55, inferential), 20 (.55, fairly simple inference), 13 (.49, inferential), 22 (.47, highly inferential), 11 (.46, inferential), 15 (.46, fairly simple inference), 24 (.44, fairly simple inference), 19 (.40, answer found directly in text), 14 (.35, answer directly in text), 12 (.35, very simple inference), 23 (.35, very simple inference), and 16 (.33, highly inferential answer).

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1. See Table 1.

TABLE 1

Unrotated Components Loadings (Numbers are rounded to two decimal places)

N = 286. 143 English. 143 Arabic. * = Significant. Loadings below .30 are not significant.

Variate	English Components										Com-	Arabic Components										Com-
	1	2	3	4	5	6	7	8	9	10	munalities	1	2	3	4	5	6	7	8	9	10	munalities
1. Speed Recognition	.49*	-.26	.45*	-.10	.33*	-.04	-.03	.17	-.04	-.16	.69	.41*	-.02	-.34*	.27	.05	.22	-.08	.54*	.00	.02	.72
2. Complex	.30*	-.41*	.27	.01	.47*	.00	-.31*	.29	.01	-.25	.79	.38*	.12	-.19	.04	.16	-.31*	.62*	-.18	.04	.04	.74
3. Simple	.08	.28	.01	.10	.30*	.11	.58*	-.19	.37*	-.37*	.84	.26	-.03	-.13	-.28	-.00	.52*	-.07	-.27	-.20	-.36*	.68
4. Very simple	.30*	.18	.29	.61*	-.10	-.16	.12	-.04	-.06	.11	.65	.20	.05	-.34*	-.08	.10	.37*	.12	.02	-.19	.02	.36
5. Complex	.43*	.06	.29	.20	-.11	.35*	-.03	-.01	-.37*	.17	.61	.42*	.14	-.43*	.02	.01	-.09	-.04	-.31*	.28	-.37*	.70
6. Very complex	.45*	-.28	.35*	-.15	-.34*	.17	.14	-.37*	.03	-.21	.77	.24	.18	-.02	.17	.22	-.22	-.51*	.27	-.28	.14	.64
7. Simple	.47*	.05	.19	.25	.08	-.35*	.26	.06	.15	.33*	.65	.41*	.03	-.45*	-.09	-.14	-.15	-.28	-.09	.08	-.10	.52
8. Complex	.52*	-.01	.32*	.23	-.02	-.30*	.06	.26	-.11	-.02	.60	.42*	.10	-.37*	-.24	-.09	-.37*	-.00	.28	.07	-.03	.61
9. Very complex	.50*	-.03	.42*	-.28	-.32*	-.02	.16	-.26	-.00	.04	.70	.14	.21	-.31*	.49*	-.04	.36*	.10	.22	.19	.09	.63
10. Inferential	.22	-.42*	-.03	-.41*	.36*	.11	.31*	.05	-.06	.26	.71	.28	.29	-.04	.27	.02	-.16	-.40*	-.52*	.08	.13	.72
11. Inferential	.46*	-.01	-.11	-.07	.22	.22	-.15	-.16	.37*	.52*	.79	.37*	.32*	.06	.16	-.28	-.01	.04	-.02	-.45*	-.23	.58
12. Very simple inference	.35*	.10	-.06	.05	-.13	.40*	.19	.60*	.05	.06	.72	.17	.62*	.54*	.05	-.22	.07	-.01	.11	.21	-.05	.82
13. Inferential	.49*	-.16	-.37*	.10	.17	-.20	-.13	-.18	-.26	.15	.60	.24	-.14	.26	-.06	.57*	.37*	-.17	-.16	.13	.22	.73
14. Directly seen in text	.35*	.26	-.13	.31*	.07	.49*	.23	.02	-.24	-.04	.66	.21	.66*	.40*	.02	-.29	.10	.09	.10	.18	-.10	.80
15. Fairly simple inference	.46*	.12	-.40*	-.06	.04	-.21	.15	-.20	-.35*	.04	.61	.62*	-.51*	.32*	.24	-.13	-.10	.07	-.04	.04	.02	.94
16. Highly inferential	.33*	-.20	-.30	-.25	-.28	.09	.28	.21	.06	.07	.51	.22	.22	-.00	.47*	.05	.00	.20	-.28	-.18	.44*	.66
17. Inferential	.66*	-.05	-.18	-.11	-.07	-.27	-.03	.02	-.08	-.12	.58	.28	.05	.36*	-.14	.47*	-.29	-.02	.15	-.15	-.33*	.69
18. Inferential	.63*	-.01	-.28	-.32*	.04	-.02	.11	.04	-.10	-.20	.64	.47*	.07	.29	.18	.46*	.06	-.03	.01	.12	-.30*	.66
19. Directly seen in text	.40*	.13	-.08	.22	.45*	.31*	-.18	-.34*	-.04	-.08	.69	.55*	-.31*	-.05	.10	.07	-.05	-.01	.10	.51*	.10	.70
20. Fairly simple inference	.55*	.21	-.36*	.14	-.15	-.02	-.22	.10	-.05	-.26	.65	.67*	-.51*	.21	.17	-.28	-.01	.02	.01	.09	-.05	.87
21. Inferential	.55*	.01	-.28	.25	-.06	-.17	-.08	.03	.50*	-.05	.82	.50*	.15	-.01	-.39*	.13	.25	.26	.08	-.07	.12	.60
22. Highly inferential	.47*	-.21	.01	.04	-.33*	.34*	-.43*	-.07	.21	-.00	.73	.25	-.10	.10	-.48*	-.34*	.15	-.28	-.04	.26	.23	.65
23. Very simple inference	.35*	.69*	.24	-.44*	.12	-.02	-.15	.10	-.05	.08	.90	.61*	-.45*	.20	.10	-.34*	.10	-.02	-.05	-.21	-.05	.80
24. Fairly simple inference	.44*	.74*	.18	-.34*	-.02	-.10	-.18	.00	.09	.00	.94	.43*	-.01	.18	-.44*	.03	-.17	.17	.08	-.03	.33*	.59
25. Total score	.98*	-.03	-.05	.00	.10	.10	.03	.05	.04	-.00	.99	.96*	.18	-.06	-.02	.07	.04	-.01	-.00	-.01	.06	.97
26. Academic mark	.77*	-.32*	.02	.06	-.20	-.10	-.01	-.04	.05	-.02	.75	.58*	.26	-.15	-.25	.03	-.06	-.12	-.06	-.20	.20	.59
Percentage of variance	24.20	7.63	6.64	5.99	5.32	4.97	4.74	4.06	3.97	3.57		19.04	8.29	7.22	6.17	5.53	4.89	4.62	4.42	4.16	4.00	
Total Percentage of Variance											71.08											68.34

As has already been noticed, all these loadings contribute to the total, since all together form the reading test. Hence this component could be taken as a general reading ability.

Arabic: This component, which accounts for 19.04% of the variables' variance, is the largest share too. It is also a general reading ability, since it follows the same pattern of the English component; only it has fewer significant loadings. The highest are the total of the reading test (.96) and the average of the students' academic marks (.58).

The subsequent loadings, in order of magnitude of both the speed-recognition test items and the comprehension test items, are as follows: speed-recognition 5 and 8 (.42, complex), 1 and 7 (.41, speed and simple), and 2 (.38, complex); comprehension 20 (.67, fairly simple inference), 15 (.62, fairly simple inference), 23 (.61, very simple inference), 19 (.55, directly seen in text), 21 (.50, inferential answer), 18 (.47, inferential), 24 (.43, fairly simple inference), and 11 (.37, inferential). There is a reasonable agreement between the loadings of English and Arabic versions of corresponding items.

The loadings of the complex answers together with those highly inferential answers are not significant in this component. Perhaps this suggests that these items are too complex to form a part of the Iraqis' general reading ability.

All the following components, whether English or Arabic, are bi-polars. Their loadings are partly positive and partly negative. Thus the sub-tests are divided into groups each perhaps measuring either a certain aspect or level of reading ability, though many of them overlap.

Component 2[1]

English: The loadings of this component cover 7.63% of the total variance. The significant loadings are five; three negatives and two positives. Loadings of items numbers 2, 10 and 26 (-.41, -.42, and -.32), which are moderately significant, stand for a complex item of the speed recognition test, an inferential item of the comprehension test, and the students' average of their academic mark. This may indicate that these items are similar in the nature of the complexity of mental operations they demand.

Items 23 and 24, with positive high significant loadings (.69 and .74), are separated from the other three items to show different aspects of reading or perhaps different levels of complexity in reading.

However, the complex and inferential items are distinguished from the very simple and the fairly simple, inferential answers except for item 24 which (Table 26, Chapter VII) does not appear simple as judjed by percentage response. The other inferential and highly inferential answers carry negative loadings, though not significant.

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1. See Table 2.

Item number 23 has high significant loadings in the English component as well as the Arabic component (.69 and -.45). This indicates that this item, which represents a very simple inference, is prominent in both the English and the Arabic components to exhibit a skill that the Iraqi University students possess in both languages. Tentatively this component is considered to be one which separates simple and complex items.

Arabic: The Arabic component accounts for 8.29% of the total variance. It has seven significant items; three positive and four negative. Items 11, 12, and 14 have positive loadings of .32, .62, and .66. Although these three loadings are different in their degree of significance, they represent the same aspect of reading, since they share the positive area. But as the loading of item 11 is much lower than the loadings of the other two items, it is obvious that the items may be affected differently by the same reading skill.

The four negative loadings: -.51, -.31, -.51, and -.45 cover items 15 (fairly simple inference), 19 (answer directly seen in the reading passage), 20 (fairly simple inference), and 23 (very simple inference), respectively. The negative sign, common among these loadings, groups them together. This indicates that they are of the same nature, but at different levels of complexity.

The two fairly simple items are separated from the inferential item by their negative loadings (-.51 and -.51). The separation of the two very simple answers and the two answers seen directly in text from each other is

TABLE 2: COMPONENT 2

Variate		English	Arabic
1. Speed		-.26	-
2. Complex		-.41*	-
3. Simple		.28	-
4. Very simple		-	-
5. Complex	Recognition	-	-
6. Very complex		-.28	-
7. Simple		-	-
8. Complex		-	-
9. Very complex		-	.21
Comprehension:			
10. Inferential		-.42*	.29
11. Inferential		-	.32*
12. Very simple inference		-	.62*
13. Inferential		-	-
14. Seen in text		.26	.66*
15. Fairly simple inference		-	-.51*
16. Highly inferential		-.20	.22
17. Inferential		-	-
18. Inferential		-	-
19. Seen in text		-	-.31*
20. Fairly simple inference		.21	-.51*
21. Inferential		-	-
22. Highly inferential		-.21	-
23. Very simple inference		.69*	-.45*
24. Fairly simple inference		.74*	-
25. Total		-	-
26. Academic mark		-.32*	.26

* Significant

perhaps due to the nature of the passages. The positive loadings belong to reading passage number 1, while the negative loadings belong to passages numbers 2 and 3. It seems that the first reading passage is easier than the others, since the percentage of correct responses to it is higher than the rest. This unrotated component in the Arabic test is difficult to identify.

Component 3 [1]

This component clearly divides the reading test into two sub-tests: the speed-recognition test and the comprehension test in both languages.

English: Inspection shows that only one of the complex items and the two very complex items in the speed-recognition test are significant. The simple items loadings are close to zero. Only 6.64% of the variance is attributed to this component.

In the comprehension test the items the answers to which are either seen in the text or very simple inferences are separated from the fairly inferential, inferential and highly inferential answers which have significant loadings. This indicates that the ability to answer questians where the answers are either found directly in text or require very simple inferences is distinct from the ability to supply fairly easy inferential, inferential or highly inferential answers.

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1. See Table 3.

TABLE 3: COMPONENT 3

Variate		English		Arabic
1. Speed	Recognition	.45*	⟶	-.34*
2. Complex		.27		-
3. Simple		-		-
4. Very simple		.29		-.34*
5. Complex		.29		-.43*
6. Very complex		.35*		-
7. Simple		-		-.45*
8. Complex		.32*	⟶	-.37*
9. Very complex		.42*	⟶	-.31*
Comprehension:				
10. Inferential		-		-
11. Inferential		-		-
12. Very simple inference		-		.54*
13. Inferential		-.37*		.26
14. Seen in text		-		.40*
15. Fairly simple inference		-.40*	⟶	.32*
16. Highly inferential		-.30*		-
17. Inferential		-		.36*
18. Inferential		-.28		.29
19. Seen in text		-		-
20. Fairly simple inference		-.36*		.21
21. Inferential		-.28		-
22. Highly inferential		-		-
23. Very simple inference		.24		.20
24. Fairly simple inference		-		-
25. Total		-		-
26. Academic Mark		-		-

* Significant

Arabic: The loadings of the speed-recognition test are too overlapping to state clearly what item or group of items is testing what. To this component 7.22% of the variance is attributed. In the comprehension test the highly inferential items are separated from the rest. The highly inferential items have relatively low loadings which suggest that the ability to answer them is partially different from the ability to answer the others.

Items 8 and 9 of the speed-recognition test (complex and very complex), and items 15 and 20 (fairly simple inference) show similarity in both the Arabic and the English components. This may mean that these items require the same ability in both languages.

Component 4 [1]

5.99% and 6.17% of the English and Arabic variances are attributed to this component.

English: Item four (very simple answer) of the speed-recognition test carries a fairly high significant loading (.61) which separates it from the other items. This indicates clearly that this item requires a distinct ability.

In the comprehension test, item 14 (requiring an answer seen directly in text) is separated from all the inferential items by carrying a positive significant loading (.31), while the inferential items carry either negative

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1. See Table 4.

TABLE 4: COMPONENT 4

Variate		English	Arabic
1. Speed	Recognition	-	.27
2. Complex		-	-
3. Simple		-	-.28
4. Very simple		.61*	-
5. Complex		.20	-
6. Very complex		-	-
7. Simple		.25	-
8. Complex		.23	.24
9. Very complex		-.28	.49*
Comprehension:			
10. Inferential		-.41*	.27
11. Inferential		-	-
12. Very simple inference		-	-
13. Inferential		-	-
14. Seen in text		.31*	-
15. Fairly simple inference		-	.24*
16. Highly inferential		-.25	.47*
17. Inferential		-	-
18. Inferential		-.32*	-
19. Seen in text		.22	-
20. Fairly simple inference		-	-
21. Inferential		.25	-.39*
22. Highly inferential		-	-.48*
23. Very simple inference		-.44*	-
24. Fairly simple inference		-.34* ⟶	-.44*
25. Total		-	-
26. Academic Mark		-	-.25

* Significant

loadings or low positive loadings. The nature of this component is not clear.

Arabic: The Arabic component distinguishes the very complex item (9) from the others in the speed-recognition test; while in the comprehension test it separates item 16 (highly inferential) from the other items. Although item 22 is meant to be highly inferential, it seems different from the other highly inferential items.

Item 24 (fairly simple inference) is significant in both the English and the Arabic component.

Again, this component is difficult to identify in the Arabic test.

Component 5 [1]

5.32% and 5.53% of the English and Arabic variances are attributed to this component.

English: The speed-reccgnition test is divided into three different abilities. Itesm 6 and 9 (the very complex) are separated from the rest by carrying negative significant loadings (-.34 and -.32). Items 2 and 3 (.47 and .30) with positive significant loadings show a different ability from items 4, 5, 7, and 8, whose loadings are very low.

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1. See Table 5.

TABLE 5: COMPONENT 5

Variate		English	Arabic
1. Speed	Recognition	.33*	-
2. Complex		.47*	-
3. Simple		.30*	-
4. Very simple		-	-
5. Complex		-	-
6. Very complex		-.34*	.22
7. Simple		-	-
8. Complex		-	-
9. Very complex		-.32*	-
Comprehension:			
10. Inferential		.36*	-
11. Inferential		.22	-.28
12. Very simple inference		-	-.22
13. Inferential		-	.57*
14. Seen in text		-	-.29
15. Fairly simple inference		-	-
16. Highly inferential		-.28	-
17. Inferential		-	.47*
18. Inferential		-	.46*
19. Seen in text		.45*	-
20. Fairly simple inference		-	-
21. Inferential		-	-
22. Highly inferential		-.33* ⟶	-.34*
23. Very simple inference		-	-.34*
24. Fairly simple inference		-	-
25. Total		-	-
26. Academic Mark		-.20	-

* Significant

Items 16 and 22 (highly inferential) show a different ability requirement from the rest by their negative loadings. Though the loading (-.28) of item 16 is not significant, yet it is near the borderline. The two positive loadings belong to item 19 (.45, seen in text), and item 10 (.36, inferential). The difference between these last two loadings suggests a different ability is required for each of them. It is probably an inferential component, although the interpretation is not clear.

Arabic: In this component the inferential items are separated from all the others. The highly inferential item (22) is prominent in both the English and the Arabic components.

Component 6 [1]

The percentages of variances accounting for the English and Arabic components are 4.97 and 4.89 respectively.

English: As the items in this component show a great amount of overlapping, the interpretation is rendered rather difficult. Nevertheless, item 5 (.35, a complex speed-recognition item) is singled out from the rest. It tests something different. Items 12, 14, and 19 (.40, .49 and .31) that stand for a very simple inference and the two items the answer to which is directly found in the text, are grouped together to show they nearly measure

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1. See Table 6.

TABLE 6:COMPONENT 6

Variate		English		Arabic
1. Speed		-		.22
2. Complex		-		-.31*
3. Simple		-		.52*
4. Very simple		-		.37*
5. Complex	Recognition	.35*		-
6. Very complex		-		-.22
7. Simple		-.35*		-
8. Complex		-.30*	⟶	-.37*
9. Very complex		-		.36*
Comprehension:				
10. Inferential		-		-
11. Inferential		.22		-
12. Very simple inference		.40*		-
13. Inferential		-.20		.37*
14. Seen in text		.49*		-
15. Fairly inferential		-.21		-
16. Highly inferential		-		-
17. Inferential		.27		-.29
18. Inferential		-		-
19. Seen in text		.31*		-
20. Fairly simple inference		-		-
21. Inferential		-		.25
22. Highly inferential		.34*		-
23. Very simple inference		-		-
24. Fairly simple inference		-		-
25. Total		-		-
26. Academic Mark		-		-

* Significant

the same thing. Item 22 (.34), which is highly inferential, is separated from the other highly inferential item. This indicates that although both are inferential, the ability required to answer one of them is different from the other. Item 22, by carrying a positive weight, demands an ability which is closer to the ability required to answer the other items of significant weights, but interpretation of this ability is not clear.

Arabic: In the speed-recognition test the two complex items are separated from items 3 and 4, the simple and the very simple. At the same time they are separated from item 9, the very complex, which is certainly not as complex as item number 6 in the Arabic component.

In the comprehension test, item number 13 (inferential) is singled out. It shows a requirement of an ability which is different from all the rest.

Component 7 [1]

This component accounts for 4.74% and 4.62% of the English and Arabic variables' variance

English: Item 2 (-.31, complex) is separated from item 3 (.58, simple) in the speed recognition test.

In the comprehension test, item 10 (.31, inferential) is separated from item 22 (-.43, highly inferential).

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1. See Table 7.

TABLE7: COMPONENT 7

Variate		English		Arabic
1. Speed	Recognition	-		-
2. Complex		-.31*	⟶	.62*
3. Simple		.58*		-
4. Very simple		-		-
5. Complex		-		-
6. Very complex		-		-.51*
7. Simple		.26		-.28
8. Complex		-		-
9. Very complex		-		-
Comprehension:				
10. Inferential		.31*	⟶	-.40*
11. Inferential		-		-
12. Very simple inference		-		-
13. Inferential		-		-
14. Seen in text		.23		-
15. Fairly simple inference		-		-
16. Highly inferential		.28		.20
17. Inferential		-		-
18. Inferential		-		-
19. Seen in text		-		-
20. Fairly simple inference		-.22		-
21. Inferential		-		.26
22. Highly inferential		-.43*		.28
23. Very simple inference		-		-
24. Fairly simple inference		-		-
25. Total		-		-
26. Academic Mark		-		-

* Significant

Arabic: Item 2 (.62, complex) is separated from item 6 (-.51, very complex) to indicate that different abilities are required to answer these two items.

Item 10 (-.40, inferential) is singled out from all the others. It perhaps requires an ability which is distinct from all the others.

It is worth noting that item 2 is prominent in both components, the English and the Arabic.

Component 8 [1]

The percentages of variables' variance accounting for this component are 4.06% English and 4.42% Arabic.

English: Item 6 (.37, very complex), which is separated from the rest of the speed-recognition items, implies the existence of an ability that is distinct from all the others.

The comprehension test exhibits two different abilities that are needed to answer the very simple inferential item (.60) and the item the answer to which is directly expressed in the text (-.34).

Arabic: Speed has a psoitive significant loading (.54) which shows a disagreement with all the other items in both the speed-recognition and the comprehension tests, though at different degrees.

The inferential item number 10 shows a negative significant loading (-.52) that confirms its possession of an ability which is different from the

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1. See Table 8.

TABLE 8: COMPONENT 8

Variate		English	Arabic
1. Speed		-	.54*
2. Complex		.29	-
3. Simple		-	-.27
4. Very simple	Recognition	-	-
5. Complex		-	-.31*
6. Very complex		.37*	.27
7. Simple		-	-
8. Complex		.26	.28
9. Very complex		-.26	.22
Comprehension:			
10. Inferential		-	-.52*
11. Inferential		-	-
12. Very simple inference		.60*	-
13. Inferential		-	-
14. Seen in text		-	-
15. Fairly simple inference		-.20	-
16. Highly inferential		.21	-.28
17. Inferential		-	-
18. Inferential		-	-
19. Seen in text		-.34*	-
20. Fairly simple inference		-	-
21. Inferential		-	-
22. Highly inferential		-	-
23. Very simple inference		-	-
24. Fairly simple inference		-	-
25. Total		-	-
26. Academic Mark		-	-

* Significant

others, and it is not related to speed at all. It may need much less speed than that used in reading the speed-recognition test.

Component 9 [1]

This component accounts for 3.97% and 4.16% of the English and Arabic variances respectively.

English: Items 3 (.37) and 5 (-.37) exhibit two different types of abilities, one is specific to recognizing a simple question and the other is required for recognizing a complex item.

Items 11 (.37) and 21 (.50), which stand for inferential items, are separated from item 15 (-.35, a fairly simple inferential). Hence, this implies the existence of two distinct abilities.

Arabic: The Arabic comprehension test shows quite clearly the difference between an ability required to answer item 11 (-.45, inferential), and an ability to answer item 19 (.51, seen directly in text).

In both the Arabic and the English components item 11 is singled out.

Component 10 [2]

The percentages of variances accounting for this component are 3.57% for the English and 4.00% for the Arabic.

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1. See Table 9.

2. See Table 10.

TABLE9: COMPONENT 9

Variate		English	Arabic
1. Speed	Recognition	-	-
2. Complex		-	-
3. Simple		.37*	-.20
4. Very simple		-	-
5. Complex		-.37*	.28
6. Very complex		-	.28
7. Simple		-	-
8. Complex		-	-
9. Very complex		-	-
Comprehension:			
10. Inferential		-	-
11. Inferential		.37*	-.45*
12. Very simple inference		-	.21
13. Inferential		-.26	-
14. Seen in text		-.24	-
15. Fairly simple inference		-.35*	-
16. Highly inferential		-	-
17. Inferential		-	-
18. Inferential		-	-
19. Seen in text		-	.51*
20. Fairly simple inference		-	-
21. Inferential		.56*	-
22. Highly inferential		.21	.26
23. Very simple inference		-	.21
24. Fairly simple inference		-	-
25. Total		-	-
26. Academic Mark		-	.20

* Significant

TABLE 10: COMPONENT 10

Variate		English		Arabic
1. Speed		-		-
2. Complex		-.25		-
3. Simple		-.37*	⟶	-.36*
4. Very simple		-		-
5. Complex	Recognition	-		-.37*
6. Very complex		-.21		-
7. Simple		.33*		-
8. Complex		-		-
9. Very complex		-		-
Comprehension:				
10. Inferential		.26		-
11. Inferential		.52*		-.23
12. Very simple inference		-		-
13. Inferential		-		22
14. Seen in text		-		-
15. Fairly simple inference		-		-
16. Highly inferential		-		.44*
17. Inferential		-		-.33*
18. Inferential		-.20		-.30*
19. Seen in text		-		-
20. Fairly simple inference		-.26		-
21. Inferential		-		-
22. Highly inferential		-		.23
23. Very simple inference		-		-
24. Fairly simple inference		-		.33*
25. Total		-		-
26. Academic Mark		-		-

* Significant

English: Items 3 (-.37) and 7 (.33), which represent simple recognition, are in fact different.

Item 11 (.52) is singled out to show that it requires an ability which is different from all the other items.

Arabic: Item 3 (-.36, simple recognition) is in agreement with item 5 (-.37, complex recognition). This suggests that in the Arabic speed-recognition test these two items require the same ability, while in the English test they demand two different abilities.

Items 17 (-.33) and 18 (-.30), which represent inferential answers, are separated from item 16 (.44, highly inferential) and item 24 (.33, fairly simple inference). Items 16 and 24 by having positive loadings indicate they require ability that is fairly similar, though at different levels.

The Rotated Components

A close look at the rotated components in the following tables reveals an evident fact that each component is made up of either an item or group of items which show the existence of distinct and measurable abilities within each of the speed-recognition and the comprehension tests.

English: The following table shows clearly that items 6 and 9 (very complex recognition items) are measuring an ability that composes component number 3. Component number 4 is made up of an ability which is represented by items

4 (.70, very simple recognition) and 7 (.73, simple recognition). The highest two loadings in component 5 are item 1, speed (.68) and item 2 (.88, complex recognition). Component number 7 is solely constituted of item number 3 (.91), which is the simple recognition item.

Components 1, 2, 6, 8, 9, and 10 represent items in the comprehension test. Component 1 shows a general comprehension ability, since most of the comprehension loadings are significant. Component two is composed of items 23 and 24, the very simple and the fairly simple inferential answers. Component number 6 is mainly represented by item 14, the answer to which is directly seen in text. Item number 5, which has the second highest loading, shares this component with item 14. This may indicate that they are similar in nature. Item 12 (a very simple inferential answer) comprises component number 8. Component 9 is composed of item number 10 (.71, inferential answer) which is distinct from items 20, 21, and 22 (the fairly simple inferential, the inferential, and the highly inferential items). Component 10 mainly comprises item 11 (.82, another inferential answer).

Arabic: Component 1 is made up of items 15 (.88, fairly simple inferential answer), 19 (.92, fairly simple inferential answer), and 23 (.86, very simple inferential answer). Items 12 (.89, very simple inferential answer) and 14 (.88, answer seen directly in text) define component number

two. Component number three indicates a general reading ability. All the significant items are positive. The highest two loadings in component 4 belong to item 1 (.75, speed) and item 9 (.71, very complex answer) of the speed-recognition test. Component 5 is constituted of the inferential answers, since items 17 (.74) and 18 (.65) are the highest positive loadings. At the same time they are separated from item 22 (-.45, the highly inferential answer). Components 6, 7 and 8 represent the speed-recognition items. Items 3 (.77) and 4 (.43), which are the simple and very simple recognition items, carry the highest loadings in component 6. Component 7 is representing item 6 (.75, the very complex answer). Item 5 (.76, the complex recognition item) has the highest loading in component 8. Component nine's highest loading is item thirteen's loading (.77) which is inferential. The highest loading in component 10 is .79 which belongs to item 16, the highly inferential answer.

Although these highly significant items are separated from the rest, yet sometimes the separation is not complete. All the other loadings, though not very high, are positive and quite often are significant. Thus this means that although these highly loaded items are measuring a special ability, they have something in common with the other positive significant, though low, loadings. Hence, some of the items have something in common, while others measure things quite different.

TABLE 11

First-Year English. Varimax Rotation of Component Loadings (Numbers are Rounded to two Decimal Places)

* Significant

Variate	Component Number 1	2	3	4	5	6	7	8	9	10
1. Speed	.11	.12	.30	.20	.68*	.07	.05	-.03	.18	.03
2. Complex	.05	-.06	-.02	.02	.88*	.00	-.06	.01	.01	.08
3. Simple	-.03	.05	.03	.07	-.02	.09	.91*	.02	.02	.00
4. Very simple	-.01	-.03	.08	.70*	-.03	.29	.04	-.10	-.22	-.01
5. Complex	.03	.11	.29	.24	.09	.62*	-.24	.09	.02	.03
6. Very complex	.09	-.05	.85*	.02	.11	.10	.08	-.01	.01	.02
7. Simple	.17	.09	.06	.73*	.04	-.05	.10	.06	.13	.22
8. Complex	.20	.13	.15	.61*	.34*	.06	-.07	.14	-.07	-.12
9. Very complex	.11	.26	.74*	.21	.00	.01	-.02	.03	.12	.03
10. Inferential	.19	-.09	.10	-.10	.24	-.03	.04	.19	.72*	.19
11. Inferential	.13	.15	.06	.08	.03	.10	-.02	.06	.17	.83*
12. Very simple inference	-.00	.11	-.05	.11	.09	.30*	.02	.77*	-.04	.06
13. Inferential	.68*	-.11	-.05	.12	.08	.13	-.16	-.15	.06	.22
14. Seen in text	.17	.02	-.02	.07	-.07	.73*	.21	.22	-.06	.03
15. Fairly simple inference	.73*	.09	.01	.09	-.17	.15	.03	-.06	.12	-.03
16. Highly inferential	.33*	-.09	.21	-.06	-.12	-.10	-.01	.55*	.14	.08
17. Inferential	.65*	.14	.21	.17	.17	-.07	-.03	.14	-.09	.05
18. Inferential	.65*	.20	.20	-.10	.17	.03	.13	.27	.06	.04
19. Seen in text	.25	.08	-.03	.06	.25	.52*	.23	-.29	-.08	.37
20. Fairly simple inference	.56*	.15	-.00	.02	.06	.17	-.00	.21	-.48*	.08
21. Inferential	.37	-.03	.03	.28	.08	-.16	.23	.20	-.41*	.48
22. Highly inferential	.10	-.04	.43*	-.11	.17	.15	-.27	.19	-.39*	.46
23. Very simple inference	.08	.94*	.03	.03	.05	.10	-.00	.04	.04	.04
24. Fairly simple inference	.16	.92*	.11	.10	-.03	.02	.07	.01	-.17	.12
25. Total	.61*	.21	.30*	.31*	.35*	.23	.10	.27	-.03	.35
26. Academic Mark	.49*	-.09	.48*	.31*	.25	.02	-.08	.21	-.10	.24

TABLE 12

First-Year Arabic. Varimax Rotation of Component Loadings. (Numbers are Rounded to Two Decimal Places)

* Significant

Variate	Component Number 1	2	3	4	5	6	7	8	9	10
1. Speed	.18	-.06	.12	.75*	.07	.05	.23	.10	-.04	-.08
2. Complex	.04	-.09	.42*	.05	.30	-.10	-.42	.26	-.18	.41
3. Simple	.10	.00	.03	-.04	.02	.77*	-.07	.17	.09	-.13
4. Very simple	-.06	-.15	.21	.30	-.03	.43	-.03	.03	.01	.08
5. Complex	.03	.02	.02	.10	.15	.18	-.20	.76*	-.04	.07
6. Very complex	.00	-.01	.09	.14	.20	-.11	.75*	.06	-.01	.08
7. Simple	.11	-.10	.14	.09	-.12	.10	.21	.62*	-.10	-.07
8. Complex	.04	-.06	.46*	.17	.05	.15	.13	.44	-.30	-.19
9. Very complex	-.03	.15	-.14	.71*	-.11	.04	-.06	.09	.03	.22
10. Inferential	.04	.19	-.13	-.19	-.07	-.01	.33	.51	.20	.47
11. Inferential	.22	.32	.06	.03	.14	.33	.21	.07	-.47	.24
12. Very simple inference	-.02	.89*	.07	-.01	.08	-.08	.04	-.05	.02	.03
13. Inferential	.08	-.05	.13	.01	.20	.18	.09	-.10	.77*	.10
14. Seen in text	-.04	.88*	.11	.06	.04	.01	-.04	.02	-.10	.05
15. Fairly simple inference	.88*	-.02	.09	.01	.15	-.12	-.04	.06	.11	.09
16. Highly inferential	.08	.06	.08	.13	-.05	-.04	.05	-.03	.03	.79*
17. Inferential	.08	.07	.19	-.19	.74*	-.02	.18	-.02	.04	-.15
18. Inferential	.22	.21	.02	.13	.65*	.09	.05	.14	.32	.06
19. Seen in text	.46	-.03	.16	.29	.09	-.25	-.13	.39	.33	-.12
20. Fairly simple inference	.92*	-.03	.12	.06	.05	.05	.02	.07	-.03	.02
21. Inferential	.07	.12	.64*	.15	.10	.33	-.11	.01	.12	.01
22. Highly inferential	.18	.25	.35*	-.16	-.45	.07	.08	.16	.25	-.31
23. Very simple inference	.86*	-.00	.11	.11	-.04	.21	.06	.02	-.06	.02
24. Fairly simple inference	.19	.06	.71*	-.15	.02	-.09	.01	-.04	.08	-.01
25. Total	.41*	.22	.55*	.26	.22	.22	.19	.43	.11	.21
26. Academic Mark	.08	.09	.56*	.01	.01	.22	.31	.30	-.02	.17

Since the fourth-year groups are much smaller populations than the first-year group, the interpretations of their components may not be meaningful. Hence it has been decided to present them in the appendices.[1] At the same time, it should be remembered that these interpretations are to be regarded as highly tentative in view of the relatively small sizes of the groups involved.

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1. Appendix V.

CHAPTER IX

VALIDITY AND RELIABILITY OF TESTS

"The question we ask about a test will vary in each case depending on purpose, time, subject, etc. In general, however, we must ask if a test is valid, reliable, economical, and administrable."

At the outset of this investigation, definitions of the aspects of reading, which were going to be tested as separate units and combined as a whole, were given. In Chapters IV and V face validity and content validity were established. The aim of this chapter is to give more evidence as to how successful, accurate and consistent the tests were in measuring what they were intended to measure.

Unless the tests (designed for the present investigation) were proved to be valid and reliable, the interpretation of the results would be meaningless and useless. What, then, are validity and reliability? Since a test should be highly reliable in order to be highly valid, and a highly valid test should not necessarily be reliable, reliability will be described and discussed first.

Reliability

The reliability of a test is usually defined as measuring consistently whatever it sets out to measure.

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1. Lado, R., 1962, p.30.

The reliability of a test could be established in a number of ways: 1) The test-retest reliability coefficient. 2) The two forms' reliability coefficient of a test. 3) The split-half reliability coefficient. 4) The item total correlation coefficient which in its turn could be carried out by using: a) product moment correlation; b) rank order correlation; or c) Biserial correlations. 5) Standard error. 6) Factorial reliability. 7) Kuder-Richardson formula.

To investigate the reliability of the tests of the present work, which were fully described in Chapter IV, two approaches were undertaken:

1) Item-total correlation using product moment correlation.

2) Kuder-Richardson formula.

The item-total correlation was thought to be useful not only because it concerns the reliability of each item of the test, but it also accounts for their validity, since Long[1] explains that: "It has been the fairly general custom to accept as the criterion, total scores on the test of which the items form a part." Being available, product moment coefficient was used to save wastage of time; the two other forms of correlation mentioned above have no specific merit attached to them to be preferred to product moment correlation.

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1. 1935.

To provide an index of interscores reliability coefficient, tables of product moment correlation for the speed-recognition tests and the comprehension test for the four groups are provided below.

The Kuder-Richardson formula - the second approach to determining the test reliability - was used because of its popularity and high prestige.

The formula is:

$$R = \frac{n}{n-1}\left(\frac{\sigma^2 - \sum Pq}{\sigma^2}\right)$$

where n = number of items

P = proportion of the cases who answered the questions correctly.

$q = 1 - P$

σ = standard deviation of the distribution of total scores.

This formula, an internal consistency method, was used to establish the reliability of the comprehension test only as it could not be used for the speed-recognition test. The reliability coefficient derived from applying the Kuder-Richardson formula for the purpose of our test (to evaluate level of the testees' accomplishment)[1] were satisfactorily high.

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1. Lindquist, E.F., 1951, p.609.

TABLE 1 - First Year

Recognition Item — Total Correlation Product Moment

Item	Total English	Total Arabic
1 = 2 *	0.43	0.44
2 = 3	0.30	0.38
3 = 4	0.55	0.40
4 = 5	0.50	0.59
5 = 6	0.40	0.28
6 = 7	0.63	0.49
7 = 8	0.65	0.52
8 = 9	0.43	0.51

* Recognition items start from number 2 on the correlation matrices.

Numbers are rounded to Two Decimal Places.

N = 143.

TABLE 2 - First Year

Comprehension Item – Total Correlation Product Moment

Item	Total English	Total Arabic
1 = 12*	0.31	0.35
2 = 13	0.49	0.39
3 = 14	0.36	0.33
4 = 15	0.57	0.36
5 = 16	0.34	0.31
6 = 18 **	0.50	0.53
7 = 19	0.42	0.29
8 = 20	0.62	0.39
9 = 21	0.66	0.52
10 = 22	0.39	0.37
11 = 24**	0.59	0.52
12 = 25	0.59	0.51
13 = 26	0.49	0.37
14 = 27	0.32	0.50
15 = 28	0.41	0.52

* Comprehension items start from No. 12 on the correlation matrix.

** Missing numbers are the totals of above items.

Numbers are rounded to two Decimal Places.

N = 143.

TABLE 3

Recognition Item – Total Correlation: Fourth-Year Science

Item	Total English	Total Arabic
1 = 2*	0.50	0.27
2 = 3	0.17	0.24
3 = 4	0.21	0.41
4 = 5	0.43	0.32
5 = 6	0.40	0.27
6 = 7	0.50	0.52
7 = 8	0.53	0.39
8 = 9	0.38	0.35

* Recognition items start from number 2 on the correlation matrices.

Numbers are rounded to Two Decimal Places.

N = 72.

TABLE 4

Comprehension Item – Total Correlation: Fourth-Year Science

Item	Total English	Total Arabic
1 = 12*	0.44	0.29
2 = 13	0.27	0.39
3 = 14	0.31	0.26
4 = 15	0.07	-0.07
5 = 16	0.07	-0.07
6 = 18**	-0.01	0.03
7 = 19	0.55	0.48
8 = 20	0.49	0.61
9 = 21	0.44	0.57
10 = 22	0.02	0.10
11 = 24**	0.56	0.53
12 = 25	0.38	0.28
13 = 26	0.75	0.59
14 = 27	0.67	0.39
15 = 38	0.36	0.35

* Comprehension items start from No. 12 on the correlation matrix.

** Missing items are totals of items above them.

Numbers are rounded to Two Decimal Places.

N = 72.

TABLE 5

Recognition Item — Total Correlation: Fourth-Year Arts

Item	Total English	Total Arabic
1 = 2 *	-0.02	0.25
2 = 3	0.56	0.44
3 = 4	0.17	0.19
4 = 5	0.67	0.49
5 = 6	0.29	0.54
6 = 7	0.33	0.24
7 = 8	0.46	0.54
8 = 9	0.22	0.51

* Recognition items start from number 2 on the Correlation Matrices

Numbers are rounded to Two Decimal Places.

N = 30.

TABLE 6

Comprehension Item – Total Correlation: Fourth-Year Arts

Item	Total English	Total Arabic
1 = 12*	0.47	0.31
2 = 13	0.49	0.58
3 = 14	0.11	0.00
4 = 15	0.22	0.39
5 = 16	0.43	0.37
6 = 18**	0.40	0.54
7 = 19	0.10	0.00
8 = 20	0.43	0.30
9 = 21	-0.19	0.25
10 = 22	0.50	0.60
11 = 24**	0.58	0.58
12 = 25	0.11	0.07
13 =26	0.50	0.54
14 = 27	0.48	0.37
15 = 28	-0.06	0.27

* Comprehension items start from No. 12 on the Correlation Matrices.

** Missing items are total of items above them.

Numbers are rounded to two decimal places.

N = 30.

TABLE 7

Recognition Item – Total Correlation: Fourth-Year Social Studies

Item	Total English	Total Arabic
1 = 2*	0.60	0.00
2 = 3	0.37	0.42
3 = 4	0.36	0.37
4 = 5	0.51	0.45
5 = 6	0.34	0.33
6 = 7	0.65	0.36
7 = 8	0.66	0.47
8 = 9	0.37	0.46

* Recognition items start from number 2 on the Correlation Matrices.

Numbers are rounded to Two Decimal Places.

N = 42.

TABLE 8

Comprehension Item – Total Correlations: Fourth-Year Social Studies

Item	Total English	Total Arabic
1 = 12*	0.75	0.61
2 = 13	0.79	0.24
3 = 14	-0.11	0.20
4 = 15	0.74	0.38
5 = 16	0.10	-0.23
6 = 18**	0.04	0.29
7 = 19	0.65	0.44
8 = 20	0.67	0.14
9 = 21	0.12	-0.04
10 = 22	0.65	0.52
11 = 24**	0.38	0.32
12 = 15	-0.05	-0.17
13 = 26	0.52	0.68
14 = 27	0.66	0.42
15 = 28	0.29	0.61

* Comprehension items start from No. 12 on the correlation matrices.

** Missing items are total of items above them.

Numbers are rounded to two Decimal Places.

N = 42.

In the following table reliability coefficients for the four tests of comprehension are given by applying K-R formula.

TABLE 9

Reliability Coefficients of Comprehension Tests

	English	Arabic
First Year	0.92	0.93
Fourth Science	0.95	0.92
Fourth Arts	0.93	0.91
Fourth Social Studies	0.97	0.90

From the table above, the investigator could be satisfied that she was dealing with statistically reliable data.

To provide further information concerning the reliability of the comprehension test, the intercorrelation of the two forms of test (English and Arabic) was taken into account. The intercorrelation between the English form and the Arabic form of the test were summarized in the following table. The results were quite satisfactory. Obviously, if the two forms were in English or in Arabic the intercorrelation coefficient would be much higher. And, even now, the correlations are by no means low for evaluating our students' level of reading accomplishment. The minimum correlation for this purpose is (.50) as stated by Kelley.[1]

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1. In Lindquist, ibid.

TABLE 10

Intercorrelation of English and Arabic forms of the Test

First Year	0.77
Fourth Sciences	0.83
Fourth Arts	0.90
Fourth Social Studies	0.86

Validity

The validity of a test, in a general sense, is that aspect of a test that reports the degree of accuracy with which it measures what it claims to measure. There are many ways of discovering whether or not a test is actually functioning in this way. One way of doing it is to correlate two sets of measures, those of the test itself and of the criterion. Unfortunately, there is no such approved test of reading for Arab readers to be used as an adequate criterion for the present test. Nevertheless, the students' achievement scores were used as a measuring rod here. The school leaving average mark was used as a criterion for the first-year university students; and the third-year average score was used as a criterion for the fourth-year university students. Shortage of time made it rather impossible to wait for the students' average at the end of the academic year in which the reading test was carried out. Moreover, the investigator's financial position would not allow her to go to Iraq again to obtain the information required. And, to get the information in time by correspondence was rather hopeless. Though this criterion was not a good criterion, it might serve the purpose to a certain extent. P. E. Vernon[1]

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1. 1940, p.157.

stated that "a school certificate..., is some criterion of aptitude for any intellectual occupation, or... albeit not a very good one."

Table 11 below gives the validity coefficients between the tests and the criteria, of four different groups of student, in English and Arabic. The validity coefficient of the Arabic version of the test was extremely satisfactory. Two groups (first year and fourth-year social studies) of the English version had fairly high validity coefficients. The fourth-year sciences and arts' validity coefficients, which were .50 and .55 respectively, were not really high. Perhaps this is due to the unsuitability of the criteria.

Another form of reporting validity coefficients is by factorial (component) validity, where the communalities indicate the overall extent of their correlation with the other variables. These communalities will be seen in Tables 12, 13, 14 and 15 below. "They are independently obtained from the actual factor loadings of the factor matrix, by squaring each of the... loadings and adding."[1]

The communalities shown in Table 12 are high enough to term the first year reading tests as valid and reliable. The predictive validity of the English test, which is the result of the multiplication of the test loading and the criterion loading, is satisfactorily high. The Arabic version predictive

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1. Cattell, R. B., 1952, p.61.

TABLE 11

Validity Correlation between Test and Criterion

Year	English	Arabic
First	0.68	0.56
Fourth Science	0.50	0.80
Fourth Arts	0.55	0.85
Fourth Social Studies	0.77	0.91

TABLE 12

Communalities of Items: First-Year Students

Nature of items	Speed	Recognition							
No. of items	1	2	3	4	5	6	7	8	9
Communality*	.69	.79	.84	.65	.61	.77	.65	.60	.70
	.72	.74	.68	.36	.70	..4	.52	.61	.63

Nature of items	Comprehension								
No. of items	10	11	12	13	14	15	16	17	18
Communality	.71	.79	.72	.60	.66	.61	.51	.58	.64
	.72	.58	.82	.73	.80	.94	.66	.69	.66

Nature of items	Comprehension								
No. of items	19	20	21	22	23	24	25	26	Predictive validity
Communality	.69	.65	.82	.73	.90	.94	.99	.75	.74
	.70	.87	.60	.65.	.80	.59	.97	.59	.57

*Top numbers are the English item communality; and
the second number is the Arabic item Communality.

TABLE 13

Communalities of Items : Fourth-Year Sciences

Nature of items	Speed	Recognition							
No. of items	1	2	3	4	5	6	7	8	9
Communality*	.70 .70	.70 .79	.87 .76	.81 .70	.72 .52	.79 .72	.76 .65	.52 .60	.50 .70

Nature of items	Comprehension								
No. of items	10	11	12	13	14	15	16	17	18
Communality	.72 .64	.65 .64	.62 .82	.77 .71	.98 .56	.83 .72	.76 .54	.84 .72	.75 .72

Nature of items	Comprehension								
No. of items	19	20	21	22	23	24	25	26	Predictive validity
Communality	.72 .61	.64 .71	.71 .79	.83 .71	.69 .81	.74 .86	.97 .97	.68 .82	.66 .80

* Top numbers are the English items communalities; and the second numbers are the Arabic items communalities.

TABLE 14

Communalities of Items: Fourth-Year Arts

Nature of items	Speed	Recognition							
No. of items	1	2	3	4	5	6	7	8	9
Communality*	.73 .82	.83 .80	.62 .84	.90 .86	.79 .75	.83 .81	.86 .77	.78 .81	.86 .78

Nature of items	Comprehension								
No. of items	10	11	12	13	14	15	16	17	18
Communality	.90 .81	.81 .73	.88 .94	.85 .80	.87 .86	.83 .85	.79 .69	.94 .77	.73 .93

Nature of items	Comprehension								
No. of items	19	20	21	22	23	24	25	26	Predictive validity
Communality	.82 .74	.67 .83	.82 .78	.74 .80	.72 .72	.85 .73	.96 .99	.85 .90	.72 .89

* Top numbers are the English items communalities, and the second numbers are the Arabic item communalities.

TABLE 15

Communalities of Items:- Fourth-Year Social Studies

Nature of items	Speed	Recognition							
No. of items	1	2	3	4	5	6	7	8	9
Communality*	.75 .88	.82 .94	.75 .77	.68 .73	.82 .85	.78 .76	.73 .59	.68 .78	.80 .87

Nature of Items	Comprehension								
No. of items	10	11	12	13	14	15	16	17	18
Communality	.79 .78	.79 .83	.84 .88	.90 .80	.91 .72	.77 .68	.78 .78	.82 .64	.82 .75

Nature of items	Comprehension								
No. of items	19	20	21	22	23	24	25	26	Predictive validity
Communality	.85 .83	.83 .81	.80 .70	.76 .78	.82 .81	.74 .80	.96 .94	.82 .91	.77 .86

* Top numbers are the communalities of items in English; and the second numbers are the communalities of items in Arabic.

validity is moderately high. The results of the multiplication is the correlation between the two tests.[1]

The fourth-year tables of communalities show also a satisfactory high validity coefficients.

Since "some psychologists have argued that factorial validity provides the clearest description of what a test measures and should therefore be preferred to other types of validity"[2] the present test component coefficients could be considered the most satisfactory estimate of their validity and reliability.

As this test was supposed to be partly achievement and partly aptitude, both content and predictive validities were demonstrated. Tyler, suggested "If it is to be used as an aptitude test predictive validity must be demonstrated. If it is to be used as an achievement test, content validity is important."[3]

A third method of revealing the validity of a test is through content validity which is also known as logical validity or validity by definition. From the descriptions of the test and its items in Chapter IV, it is clear that the validity specific to the purpose of the investigation has been achieved and shown by component analysis. To be sure, one has only to compare the

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1. Guilford, J.P., 1965, p.477.
2. Anastasi, Anne, 1956, p.126.
3. Tests and Measurements, 1963, p.59.

acts evoked by the test, in the component analysis, with the acts specified by the statement of the objective of each item and of the test as a whole in Chapver IV.

"A more direct method of investigation, which is always to be preferred wherever feasible, is to give the test to a representative sample of the group with whom it is to be used, observe and score performances of the actual task by members of this sample, and see how well the test performances agree with task performances."[1]

This procedure was carried out and each test was given to half a dozen Iraqi students who were studying in London. When the results were compared the Iraqis in London performed better, but certainly the easy items appeared to be easy for both groups and the difficult items difficult for both of them as well. This confirmed the consistency of performance on each test item.

As it has been mentioned in Chapter V, the tests were standardized to four groups of English students; and the unfair items, being rather difficult, were eliminated. Testing conditions, time and verbal instructions were standardized, since "It is important to realize the extent to which testing conditions may influence scores."[2] By standardizing the tests, ambiguity of

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1. Cureton, Edward, E., Validity, in: Lindquist, 1951, p.623.

2. Anastasi, Anne, op. cit., p.61.

instructions and questions could be detected, and faulty sentence structures were amended.

The material chosen for the test was certainly valid because it had been taken from texts of the students' courses of study.

The type of answers required for the comprehension test questions was of considerably high validity, according to what R. L. Ebel says: "Short-answer items are often credited with high validity because they require the examiner to supply an answer of his own"; and goes on: "A short-answer item is a more valid measure of achievement in reading comprehension than a choice type item is."[1] Thus the present test had proved itself to be satisfactorily reliable and valid for the purpose and the group it was devised for.

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1. In: Lindquist, 1951, p.204.

CHAPTER X

SUMMARY, DISCUSSION AND CONCLUSIONS

"Most adults are convinced that they are able to read: investigations of adult reading have for the most part formed the contrary opinion." 1

The final stage of the investigation is now reached. It is necessary to formulate conclusions and make generalizations. In the present study the derivation of the conclusions to be made depends entirely on the interpretation of the statistical results.

The plan of the present study was concerned with the relationship between reading abilities in a foreign language (English) and a mother tongue (Arabic). To achieve the purpose of the investigation the following stages had to be followed:

1) To define and depict the abilities involved in reading; and consequently decide which abilities to select for the present work. Part One of this investigation dealt in detail with this aspect of the study. Chapter I gave a clear picture of reading abilities and their nature as revealed by definitions and view points of authorities in the field. It also provided an account of the process of growth in reading and the situation of reading in the U.S.A., Britain and Iraq. Chapter II reported and reviewed studies carried

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1. Morris, R., 1963, p.85.

out in the field of reading in general, and works which were either interested in identifying the skills involved in reading comprehension, or showing the relationship of reading English and a foreign language in particular. In addition, this chapter reviewed tests devised for evaluating reading abilities. This review was thought to be of great help in designing the tests of the present experimental study. Consequently long lists of reading abilities, which were suggested by many research workers as the essential components of reading,were accumulated. Some of these abilities were identified on the basis of logical deduction; and some on systematic experiments such as that of B. Davis.[1] Chapter II also showed the little previous attention which was given to the relationship that may exist between the reading abilities of two languages and the possibility of improving one as a result of improving the other. This problem necessitated the carrying out of the present investigation. In Chapter III the importance and role of reading in the life of individuals and societies of the modern world were explained and reported as another reason to give rise to this study. It moreover depicted the scope, purpose and hypotheses of the work.

2) To construct tests that measure rate of rapid reading,[2] recognition of main ideas read in a type of everyday reading material, and power of comprehension. Chapter IV provided a description of the skills selected for

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1. 1944, pp.185-195.
2. Defined by Yoakam, 1955, p.219.

the reading tests in general and for those involved in the reading comprehension in particular.[1] It also reported the way the reading material was chosen; the tests' items were devised; and the sampling was carried out for both versions of the tests, English and Arabic. Chapter V gave an explanatory account of the procedures followed in standardizing the tests. In this way, in this chapter together with Chapter IV in which the tests were evaluated by authorities in the field,[2] the face validity and the content validity of the tests were established. In Chapter VI a description of the tests' administrations, as finally decided upon, and the scoring of the tests were given.

3) To employ statistical methods to report, analyse and interpret the results of the tests. Some preliminary statistics such as means and standard deviations, and some advanced statistics, like correlation and component analysis, were applied to the data obtained from four groups of students. Each of the groups was divided into two halves: one took the English version, and the other took the Arabic version of the tests. In all eight statistical procedures were carried out separately.

The result of applying preliminary statistics to the data showed, on the one hand, the standard of the reading abilities of each group on each of the speed, recognition, comprehension tests and the total of the reading test, and

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1. See Chapter IV, p.109.
2. See Chapter IV, p.117.

on the other, the relative standard of the reading abilities of each group in the two languages. So far as the relationship between the reading abilities in English and the reading abilities in Arabic is concerned, the conclusion will arise out of the correlation results between the English and Arabic equivalent items tabulated and described in Chapter VII, pages 230-41. The assumption that reading ability is not a single capacity, function or power, but is a composite of many functions that are divisible and measurable separately, was to be proved by the interpretation of the results of eight factor analyses by the method of Principal Components.

Analysis of data secured in Chapter VII led to the following tentative conclusions:

1) Baghdad University students are slow readers in both English and Arabic. If we go back to Chapter V and have a fresh look at the result of the English students' reading rate, we find that the speed of the first-year students at Baghdad University in English is far below the rate of the English sixth formers. But the Iraqi first-year students' rate of reading Arabic (195.88 w.p.m.)[1] is similar to that of the English sixth formers which is 191.24 w.p.m. However, among the G.C.E. students great individual rate differences were apparent. Although the English students were not highly selected, some of them read at a rate of 275 w.p.m.[2] which was higher than the fastest first-year

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1. See Chapter VII, Table 5.
2. See Chapter V, Table 1.

students, at Baghdad University, reading Arabic at a rate of 222 w.p.m. According to the educational system in Iraq, the Iraqi university students are highly selected. Hence the fast readers are the fastest.

If the comparison includes only the able G.C.E. students, it may be said that the G.C.E. students read English faster than the first-year students at Baghdad University read Arabic. The English students might have read even faster, if they had had a language like Arabic which is constructed of short words with no letters surplus when pronounced. However, the difference here is not great.

The real great difference in rate of reading exists between the P.G.C.E. students at London University and the fourth-year Baghdad University students. Iraqi fourth-year university students read Arabic at a rate of 198.73 w.p.m., while the P.G.C.E. students' rate of reading English is 373 w.p.m. The fastest read at a rate of 500 w.p.m. and the slowest read at a rate of 310 w.p.m. which is much faster than the fastest Iraqi student reading Arabic at 222 w.p.m. This reveals the effect of reading experience upon rate of reading. Hence the absence of experience might be the cause of the lack of speed improvement between the first-year group and the fourth-year group of students at Baghdad University. There was hardly any notable difference between these two groups' rate of reading.[1]

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1. See Chapter VII, Tables 5 and 9.

Unfortunately, these students are exceedingly slow in reading English. The first year students' rate of reading English is 95.59 w.p.m. and the fourth-year students' rate is 101.18. They read Arabic at a rate of 195.88 and 198.73 w.p.m. respectively, which is twice as fast as they read English. Although there is only little difference between the two groups' reading rate, a big difference exists between their reading rate of Arabic.[1] Why do these students read Arabic faster than English?

As has already been mentioned, units of meaning in the English language differe in nature from those in the Arabic language. Arabic is characterized by short words, mostly three-, four- and five-letter words. Yet the most frequent among them is the three-letter word. Thus the difference between the Iraqi university students' rate of reading English and their rate of reading Arabic might be attributed to the different nature of the two languages. To perceive a word with only three letters, like 'boy', must require less time to perceive by the eye or repeat by the tongue than a word of thirteen letters such as 'retrospective'. The thirteen-letter word is especially time consuming to a foreigner, if he tries to pronounce letters that are not usually pronounced. For example, the word 'extraordinary' needs a relatively long time to be pronounced by an Iraqi reader who is used to pronouncing each letter of a word. This was noticed by the investigator when

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1. See Chapter VII, Tables 1, 2, 5, 9, and Figures 1, 2, 8 and 9.

carrying out a study assessing the university entrants' spoken English.[1] The students used to break an English phrase into words and an English word into parts. This suggests a narrow span of reading.

Since to understand a word the details of the word should be noticed, the Iraqi readers, who lack the experience of reading long words, are liable to take more time to recognize an English word. At the same time, they read Arabic faster because their visual discrimination (in silent reading) closely resembles their productive and auditory ability of sounds. Traxler stated that: "Results of earlier studies indicating positive relationship between phonetic ability and reading ability were supported by findings in a number of recent studies."[2] Hence it can be concluded that Iraqi university students read Arabic faster than English not only because they know Arabic better but also because Arabic words are easier and faster to recognize by their nature. If the English words were as short and as easy to pronounce as the Arabic words, it might be quite possible that there would be no significant difference between the students' rates of reading in English and Arabic. The Iraqi readers' fixational pauses might be longer when reading English than when reading Arabic because of the complicated spelling-sound relationship of the English word. Since Tinker[3] stated that fixational pauses become

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1. M.Phil, 1967.
2. Traxler, A.E., & Jungeblut, A., 1960, pp.7, 121, and 123-124.
3. See Chapter II, p.52.

longer with the increasing difficulty of the reading material, the difference between the speed of those students reading English and Arabic could be attributed to the fact that the English reading material was more difficult. The difficulty arises from the difficult structure of the English word.

2) The Iraqi university students' reading deficiencies are not only quantitative but also qualitative. The first-year students' recognition achievement is below the required standard (70%) in both the English and the Arabic languages. They read slowly, and even with the slow rate they fail to recognize general ideas expressed in the everyday material they read. The averages of these students' recognition were 56 and 62 in English and Arabic, respectively, while the G.C.E. students' average of recognition in English was 69.[1]

As has been mentioned above, there is a significant difference at 0.01 level between the recognition means of the students in English and Arabic.[2] Although a significant difference exists between the means of the first year students, all combined in one big group, there is no significant difference between the means of the able students such as those of the College of Medicine and the College of Arts.[3] The significant difference

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1. See Chapter VII, Tables 14 and 15, and Chapter V, Table 1.
2. See Chapter VII, Table 1.
3. See Chapter VII, Table 1A.

between the two means of the whole groups as one might be caused by the means' difference of the social studies group. The difference between the English recognition mean of this group and their Arabic recognition mean is big.[1] This big difference between th is group's recognition performance in English and Arabic might be due to their low academic standard, and the different nature of English and Arabic. Since the structure of the language is the serious obstacle here, it can be concluded that there is no significant difference between recognition achievement of students who have a fairly high academic standard and can use their intelligence to understand the foreign language (English in this case) fairly well.

This conclusive assumption is confirmed by the result of the fourth-year students' recognition performance. The English P.G.C.E. students maintained a recognition of 71% of what they read at a rate of 373 w.p.m. The fourth-year Baghdad University students, as one big group, failed to achieve that standard in English; but they did manage to reach it in recognition of Arabic ideas.[2] The significance of the difference between the recognition means of two groups of the fourth-year students, Sciences and Arts, is absent. But the difference between the means of the Social Studies group is significant at the .01 level.[3] This may be also due to the low

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1. See Chapter VII, Table 3.
2. See Chapter VII, Tables 16 and 17.
3. See Chapter VII, Table 2.

standard of their educational achievement. They perhaps lack that level of intelligence which the other two groups possess. They might also be unfamiliar with the everyday English usage, and this lack of familiarity was the cause of their bad recognition in English. A third cause might be attributed to their narrow span of reading, since comprehension always suffers as a result of a narrow reading span.

3) The inability of the students at Baghdad University to comprehend was obvious in their poor reaction to items requiring either highly inferential or inferential answers. Although they scored relatively low on these items, their total score on comprehension was fairly good. The items that demanded answers which could be found directly in the text or which required very simple inference balanced the students' total scores. If these two last types of items which represent only a preliminary reading ability, were excluded from the tests, the majority of the students would fail the reading tests. No reader is a skilful reader until he is able to get the meaning behind the lines. Sensitivity to implied meanings is an important aspect of reading at an advanced level. Short of this ability of perception, the reader is simply unable to communicate adequately. Hence it can be concluded that students at Baghdad University are in general inefficient readers. They did not develop the habit of reading for the hidden meaning and correct interpretation. The English students, on the contrary, reacted equally well to the items demanding

inferential answers and to those requiring simple and straight-forward answers. In this respect also, the English readers were superior to the Iraqi readers.

It is both interesting and important that Iraqi students who scored high or low on an English comprehension item scored also relatively high or low on the corresponding Arabic item and vice versa.[1] Nevertheless, the comprehension achievement of some of the students was either higher or lower in one language than the other.

The first-year students' performance in reading Arabic was significantly better than their reading performance in English.[2] The only exception is the Arts group performance. Their reading comprehension in English is almost as good as their reading comprehension in Arabic. An intelligent explanation to this depends on a logical inference. As has already been stated in Chapter VII, the arts students, contrary to the others, have literary interests. This encouraged the students to study the text (a novel) in English, which in turn helped the students to perceive the English language structure. And usually the students accepted at the English departments in the Colleges of Arts and Education have a higher standard in English than the other first-year students. A reader who cannot perceive those language structures that alone are capable of carrying meaning certainly shows a weak performance. The other students

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1. Chapter VII, Tables 26 and 27.
2. Chapter VII, Table 1.

(Science and Social Studies), having no interest in literature, read the text only to pass the examination. The reading was mostly done in Arabic[1] because they were faster in reading Arabic than reading English. The reason for their lower achievement in English than in Arabic is their unfamiliarity with the English linguistic structure, especially those of punctuation which "is largely postulated upon grammatical structure."[2] Since language is the impediment, we can assume that students with a fairly good command of the English language, as the case was with the Arts students, would perform similarly well or similarly badly in both languages.

There is hardly any significant difference between the English comprehension ability and the Arabic comprehension ability of most of the fourth-year students. The absence of significant differences between the English comprehension abilities of the Sciences group and the Arts group on the one hand and their Arabic comprehension abilities on the other hand can be readily attributed to their good command of the English language.[3] The medium of instruction for the above-mentioned students is English throughout the four-year university course. The Social Studies group, whose medium of instruction is Arabic, showed significant difference between their performances in English and Arabic. Language is again the

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1. When asked the students said so.
2. Leedy, P., 1956, p.115.
3. Chapter VII, Tables 2 and 2A.

hindrance of good achievement of English as well as Arabic comprehension. The significant difference between the English general reading ability and the Arabic general reading ability of students at Baghdad University is due to the effect of the speed test. If the speed effect is removed, the significant difference will be either reduced or abolished.

From the evidence available, we believe that we may safely conclude that the English reading ability of students at Baghdad University equals their Arabic reading abilities, provided the language problem is controlled.

4) The results of correlation between the English reading tests' items and the corresponding Arabic reading tests' items revealed strong relationship between some of the items, moderate relationship between some others and absence of relationship between most of the items of the speed recognition tests.[1]

The correlations between the total of the recognition items and the total of the speed-recognition items of the first-year English test on the one hand and the alternative Arabic items on the other, are, though moderately, significant. There is hardly any significant correlation between the individual items of the two forms of the tests.[2] This might be due to: 1) the small size of the sub-tests; and 2) the difficulty of the

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1. Chapter VII, Tables 18 - 25.
2. Chapter VII, Table 18.

difference between the nature of the English and the Arabic language. We need not repeat here all the differences between the two languages that might be the cause of lack of correlation between the items of the speed-recognition tests in the two forms, especially that of the speed.[1] The 0.05 level of significance which exists between the English and the Arabic totals of speed recognition items should not be ignored. It shows that there is a chance of improving one of the languages' speed-recognition ability if the speed recognition of the other one is improved.

The fourth-year groups' results of correlation between the English speed-recognition tests and the Arabic equivalent tests do not give any significant relationship.[2] A moderate relationship ($r = .27$) exists between item 9 (difficult recognition) in English and Arabic of the Science group. Item 7 ($r = -.36$)[3] shows that it measures an ability in the English test which is different from that in the Arabic test. Here also the language difficulty rendered the English item number 7 difficult. Hence, it requires deeper thinking than that required by the Arabic item 7.

The results of correlations between the speed-recognition items in English and Arabic of the fourth-year groups must not be taken as satisfactory in the absolute sense. Since the size of a population has an effect

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1. See Chapter VII, pp. 238-41, and the present Chapter.
2. Chapter VII, Tables 19, 20 and 21.
3. Ibid., Table 21.

on the size of r, significant correlations might be obtained if the fourth-year groups were as large as the first-year group in number. On this ground, we may venture to conclude that there would be positive relationships between the ability of speed-recognition in English and Arabic, if the sizes of the groups who took the correlated tests were large, or if the effect of language difficulty was removed.

It is of great interest and significance that, 1) the relationship between the totals of the reading comprehension tests in Arabic and English is significantly high, the correlations being approximately .77, .83, .90 and .86 for the first-year group and the fourth-year groups, Sciences, Arts and Social Studies, respectively.[1] 2) The correlation between the totals of each five items, belonging to a reading passage, in English and Arabic are moderately significant in most cases. The correlations for the first-year groups are .18, .43, and .45, and for the fourth-year group are .14, .48, and .35 for the Science group, .44, .45 and .43 for the Arts group, and .38, .29 and .61 for the Social Studies group. The totals of the first five items of the Science group and the second five items of the Social Studies group are not significant. 3) Individual items in the comprehension tests are positively significant. Between the two forms of the first-year test, .

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1. Chapter VII, Tables 22 - 25.

only item 3 (r=-.22), 7 (r = .28), 9 (r = .28), 10 (r = .28), 11 (r =.19), 13 (r = .26), and 14 (r = .21) out of the 15 items are significant. Items 7, 9, 10 and 13 are significant at the .01 level. Item 3 with a negative r (-.22) indicates that this item measures an ability in the English version of the test which is different from that in the Arabic version of the test. The reason for this negative correlation might be due to the language problems here also. Since it is the only item with negative correlation, item 3 will not have a considerable effect on the interpretation of the results. Items 9 (r = .51), 15 (r = .27), and 16 (r = .29) are significant in the inter-correlation of English-Arabic test items for the fourth-year Science students. In the fourth-year Arts English-Arabic items intercorrelations, only item 2 (r = .76) is significant. The three significant items in the English-Arabic intercorrelation of tests for the fourth-year Social Studies are item 1 (r = .49), item 11 (r = .34) and item 15 (r = .57).[1]

The correlation between the totals of the reading tests in English and Arabic are highly significant for the fourth-year group of students. The first-year group's correlation is .65, while the fourth-year groups' are .66, .70 and .78 for the Science, the Arts and the Social Studies groups respectively.[2]

Four significant facts were shown by these correlation coefficients:

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1. VII, Tables 19 - 21.
2. Ibid. 22 - 25

1) Strong relationships exist between the totals of reading tests.

2) Even stronger relationships have been established between the totals of the comprehension tests.

3) Only a moderate relationship exists between the first-year speed-recognition in English and Arabic.

4) Some individual English-Arabic items intercorrelation are significant, mostly those inferential and highly inferential items.

5) The results of eight unrotated factor analyses revealed the existence of a general reading ability which basically consisted of two components, speed of comprehending general ideas involved in sbort selections of every-day reading material and power of comprehension specific to the field of the readers' specialization.[1] The students' academic averages have highly significant loadings in component one. Hence, they show strong relationships between general reading ability and the students' academic achievement. This is significant evidence to show how important reading is. Since more books are written in English than Arabic, reading English is extremely important.

The rotated components showed that each of these two major components, was composed of a 'multiplicity of related and measurable components'.

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1. Chapter VII, Table. 1, and Appendix V, Tables 1, 4 and 7.

Almost all the skills selected for the tests were represented by a component. Hence it can be said that the present study yielded similar findings to that of F. B. Davis' "Fundamental Factors of Comprehension in Reading".[1]

From the varimax rotation of component loadings tabulated in Chapter VII, the following are noticed:

A. First-year (Arabic)[2]

(a) Component 1 represents items 15, 20, and 23 (.88, fairly simple inference, .92, fairly simple inference, and .86, very simple inference). These items are grouped together to show that they measure the same ability.

(b) Component 2 stands for items 12 and 14 (.89, very simple inference, and .88, answer seen in text). These two items test the same ability also.

(c) Component 3 represents a general ability since items 25 and 26 (.55 total of the reading test, and .56 the students' academic average) and a number of other items are significant in this component.

(d) Items 1 and 9 (.75, speed, and .71, complex recognition) are represented by component 4.

(e) Component 5 represents two inferential items (.74, item 17, and .65, item 18).

(f) Item 3, simple recognition (.77), is represented by component 6.

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1. Davis, F. B., 1944, pp. 185-195.
2. For the fourth-year components see Appendix V, Tables 2, 3, 5, 6 & 9.

(g) Item 6, very complex recognition, is represented by component 7.

(h) Component 8 represents items 5 (.76, complex recognition).

Although some other items have significant loadings in this component, they are relatively low. This shows that this item is partially separated from them to show a different level of comprehension.

(i) Item 13 (.77, inferential) is represented by component 9.

(j) Item 16 (.79, highly inferential) is represented by component 10.

B, First-year (English)

(a) The first component stands for a general reading ability, where the total of the reading test with a few items of the comprehension test are significant.

(b) Items 23 and 24 (.94, very simple inference, and .92, fairly simple inference) are grouped together to show a measurement of the same ability.

(c) The two very complex recognition items (6 and 9) are grouped together in component 3.

(d) Component 4 represents items 4 and 7 (.70, very simple recognition, and .73 simple recognition).

(e) Component 5 stands for items 1 and 2 (.68, speed, and .88 complex recognition).

(f) Item 14 (.73, seen in text) is represented by component 6. Item 5 (.62, complex recognition) shares this component, but it is partially separated from item 14.

(g) Component 7 represents simple recognition (item 3, .91).

(h) Item 12 (.77, very simple inference) is represented by component 8.

(i) Component 9 represents item 10, (.72, inferential).

(j) Item 11 (.83, inferential) is represented by component 10. Another two items have significant, though relatively low, loadings in this component. The items are 21, and 22 (.43 and .46, inferential and highly inferential).

C. The fourth-year varimax rotation of component loadings - tabulated also in Appendix V, Tables 2, 3, 5, 6, 8 and 9 - separate the sub-test in a likewise manner to show they measure different abilities. Since these components are explained in Appendix V, there is no necessity for repetition here. The reader may kindly refer to Appendix V for detailed studies.

The following are some concluding points:

1) Iraqi University readers are slow readers, since they are word-by-word readers.[1] It follows that the slow readers are bad readers.[2]

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1. The investigator noticed the students' lips moving while reading, and their fingers used to move along the lines at the same time.
2. Chapter I, pp. 11 to 13.

2) Their reading experience is not only limited in amount, but also restricted in quality in both English and Arabic. Only the easy, straight-forward items were well reacted to.[1]

3) The English students were superior to the Iraqis in their reading. Perhaps this was so because the English readers have mastered the techniques of reading, such as sight reading. "The sight reader reads faster because he makes fewer stops, he understands more because his reading more closely resembles his thinking process, and he concentrates better because he derives information faster."[2]

4) Component analysis gave evidence that the hypothetical skills mentioned in Chapver IV[3] are divisible and separately measurable.

5) Since there were strong relationships between the totals and many of the comprehension items in English and Arabic, it may be concluded that improvement in the ability to read either English or Arabic may be followed by an improvement in the other language. West's[4] experiment yielded a similar result.

The above concluding remarks may not be regarded as conclusive; since this investigation, like most investigations, has its limitations, the

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1. Chapter VII, Tables 26 and 27.
2. Herrick, M.Q., 1963, p.33.
3. p 102.
4. 1926.

project should be regarded as exploratory in nature. The most obvious limitation of the study is that Iraqi readers compose only a very small minority of foreign readers of English. The results, then, may be regarded as suggestive. They may indicate that more experiments in the field are worthwhile.

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APPENDIX I

1. Instructions for Speed Test

2. Speed Test

3. Instructions for Comprehension Test

Complete the relevant points of the following section:

Name: .....

School: .....

or

College: .....

Course of Study: .....

Field of Study: .....

GENERAL DIRECTIONS TO STUDENTS [1]

This test consists of two parts, reading speed and comprehension.

Each part is timed separately. You are to work on each part only during the time allotted to it.

You will find separate directions for each part on the page preceding the actual test.

All directions should be read so thoroughly that there need be no hesitation in answering the test's items later.

The directions should be read before any attempt on the test is made. The directions should be followed exactly, as it is very important to have uniform answers to all questions in the test.

You are to read the speed test directions and work at the speed test first.

Turn over the page.

[1] All instructions are translated into Arabic and recorded for Iraqi students.

Test administers should read the students' instructions to be able to give the test.

DIRECTIONS TO STUDENTS ON THE SPEED TEST

G.C.E. STUDENTS

The following are directions for the speed test:-

There are eight selections in this part of the test.

You have to read as much as you can within the given time. You are advised to choose for yourself a speed that will enable you to identify later the general ideas of the selections you have read.

The time for reading the selections of the speed test is one minute.

Start reading when you hear the examiner saying "start", and stop reading when you hear him saying "stop".

Immediately after you stop mark the point on the line you were reading.

The time for checking your comprehension of the general ideas of the selections you have read is one minute.

You may not go back to read the selections while checking your comprehension, or at any other time.

Be careful and mark the exact place you stopped reading; the amount you read is to be checked.

You are always to remember that you have to abide by the rules of the test.

Turn over the reading speed test when the examiner says "turn over".

You will find on the next page eighteen summaries of some short passages, some of which you have read. The summaries of the selections you have read are among these. You are to identify the summaries of the selections you have read by putting a cross like this X inside the empty box provided at the end of each summary.

Now wait for the examiner's instructions.

"Start Reading".

DIRECTIONS ON THE SPEED TEST

P.G.C.E. STUDENTS

There are eight selections in this part of the test. The time for reading these selections is one minute.

You are always to remember that timing yourself is vitally important.

You are advised to choose for yourself a speed that will enable you to identify later the general ideas of the selections you have read.

You have to read as much as you can in one minute. If you finish reading before the minute is over, record your time - in seconds - in the place provided at the end of the paper. If the minute is over before you finish your reading, stop immediately and mark the point on the line you were reading.

The time for checking your comprehension of the general ideas of the selections is one minute.

You may not go back to read the selections while checking your comprehension, or at any other time.

On the next page to that of the reading selections, you will find 24 summaries. The summaries of the selections you have read are among them. You are to identify the summaries of the selections you have read by putting a cross like this X inside the empty box provided at the end of each summary.

Now, please look at your watch and start reading, or let a friend time you.

Once more, you are requested to remember to abide by the rules of the test.

SPEED TEST - READING

1. President Jamal Abd-an-Nasir today received the Soviet Deputy Foreign Minister, Yakov Malik. (Cairo in Arabic.)

2. The Sudanese Council of Ministers has agreed to the dismissal of foreign pilots operating in the harbour of Port Sudan.

3. It has been learnt that it has been decided that Libya is to participate in the meetings of the Arab Information Permanent Committee.

4. The contracts for the construction of a chemical fertilisers factory in Basrah were signed by the industry Ministry and the Japanese Mitsubishi company on the 4th October. The overall cost of the project is 8,500,000 dinars.

5. The cabinet has approved a decree imposing martial law throughout the country for a maximum period of three more months beginning on the date the National Assembly ratifies the decree. (Kuwait in Arabic.)

6. Cairo radio, which broadcast the official statement on the conclusion of the Arab leaders' meeting in Cairo at 20.00 GMT on 16th July, on 17th July announced the departure of Arif and Bumadyan for Moscow.

7. In connection with the fighting which took place on Friday and Saturday along the Suez Canal, one of our war reporters cabled this morning from Cairo to give us some details. The participation of Algerian armed forces in the fighting alongside the Arabs has been effective and direct.

8. Jaddah radio made the following announcement at 12.42 GMT on 16th July: " 'Al-Bilad' has published a statement HE the Oil and Mineral Wealth Minister, Ahmad Zaki Yamani, concerning Saudi Arabia's position on the question of resuming oil shipments to the U.S.A. and Britain. The Minister said: The Saudi Arabian Kingdom has not yet decided to resume oil pumping to the two countries in question."

Time: Minutes ..... Seconds .....

CHECKING READING SPEED

1. Rhodesia: Reports in Brief. ( )
2. The Arab Leader's Cairo Meeting. ( )
3. Zambia: Reports in Brief. ( )
4. Soviet Naval Visits to UAR. ( )
5. Malik's meeting with Nasir. ( )
6. Tanzania: Surrender of business interests by leader. ( )
7. Dismissal of four Nigerian Army soldiers. ( )
8. Western ban on papers lifted. ( )
9. Libyan participation in Arab Information Committee. ( )
10. Miartial Law in Kuwait. ( )
11. Jiddah Radio on Arab disunity. ( )
12. Cairo Radio on U.S. and Soviet Fleets in the Mediterranean. ( )
13. Cairo Radio on the South Arabian Situation. ( )
14. Algeria in Suez Canal Fighting. ( )
15. Podgorny's Message to Arif. ( )
16. The Suez Canal fighting. ( )
17. Dismissal of foreign pilots in Port Sudan. ( )
18. Contract for Japan for chemical fertiliser plant. ( )
19. Foreign Ministers' meeting in Zambia. ( )
20. The Middle East. ( )
21. Return of refugees to West Bank. ( )
22. Esuene's appeal to South-Eastern State people. ( )
23. Recruiting in the West. ( )
24. Saudi position on Oil Exports. ( )

DIRECTIONS TO THE STUDENTS
ON THE COMPREHENSION TEST

G.C.E. STUDENTS

This is a test of "reading comprehension". It consists of five passages selected from a simplified version of George Eliot's novel, "Silas Marner".

You are to read each passage, and answer the questions on each passage, one at a time.

You are supposed to read each passage in three minutes and answer the questions on each of them in five minutes. Thus you will have forty minutes to read and answer the questions on the passages.

Read a passage through completely and when you hear the examiner, who times you, telling you to turn over the page, do so. You should begin reading when you are told to do so.

On the next page you will find questions put on the passage you have read.

Start answering the questions. Put your answers in the places provided for them on the answer sheet. They are clearly shown by dots. Each three dots stands for a word. If you have three dots only, that means that your answer is one word. If you have two sets of three dots, that means your answer should consist of two words. If you have three sets of dots, your answer is to be made up of three words, and so on.

Here is an example for you:-

" 'Silas Marner', the shortest and in form the most perfect of all George Eliot's novels, is really a fairy tale expressed in everyday village life."

The Question:-

Which of George Eliot's novels is the shortest?

The Answer:-

... ...

Your answer should be "Silas Marner". You notice it consists of two words and you have two sets of three dots, and so you write the answer like this on the dotted spaces:

Silas Marner
... ...

Some times you have to choose an answer from a given set of answers and re-write it on the place provided for it on the answer sheet.

Now you hear the examiner again saying "turn over", and you should do so. You come then to the next passage on which you keep reading until you hear the examiner signal again. This is repeated until you have completed all five passages. If it happens that you have not finished either the reading of a passage or the questions you were answering when the examiner says "turn over", then mark the place you were up to and turn over your page.

Do not puzzle too long over any one question. Pass over to the next if you cannot find the answer within 30 seconds.

You should always remember that you have not got enough time to go back to the text in order to answer the questions.

At the end of the fifty minutes, when you hear the examiner say "stop", you must stop at once. If you have not finished when the examiner says "stop", mark the place you have reached and stop work.

Wait for further instructions concerning the collection of the papers.

DIRECTIONS TO THE STUDENTS ON THE COMPREHENSION TEST

P.G.C.E. STUDENTS

As this test is part of a research project, your co-operation is badly needed to render the validity of the test possible. Therefore you are requested to abide by the rules and directions of the test.

The following directions should be read before any attempt on the test is made, and should be followed exactly while you are working on the test.

This is a test of reading comprehension. It consists of five selections. You are to read each selection and answer the questions on each selection, one at a time. Please remember that your reading of the selections and answering the questions on them should be done at one sitting.

Your test booklet is made up of fifteen pages, five groups of three pages. On the first page of each group you find the reading selection; on the second page you find the questions put on the reading selection; and on the third page you see your answer sheet, i.e. the paper on which you should record your answers to the questions. You should write your answers in the spaces provided for them. They are clearly shown by either dots or blank lines. On the dotted lines you have to supply your answer yourself. Each three dots stands for a word. If you have two sets of three dots, that means your answer should consist of two words. If you have three sets of three dots, your answer is to be made up of three words, and so on. The articles and the conjunctions are to be counted as words. On the blank line you have to rewrite the answer you have chosen from the alternatives given to you.

You may read the passages as many times as it is necessary for you to understand them; but you should state the number of times you read, part of or all, the passages. At the same time, you should remember that it is vitally important that you should time yourself on the reading of each selection and on the answering of each set of questions. Record the time spent on each separately in the places provided for them on your answer sheet.

Now turn over the page, look at your watch and start reading. When you finish, look at your watch again and record the time you have spent on reading on your answer sheet. Then, turn the reading page over and start reading the questions. Write your answers on the attached answer sheet. Again, do not forget to time yourself when you start reading the questions and after you have finished answering them. This should be repeated until you complete all five passages.

Finally, you may go back to the text in order to answer some of the questions. But, please do avoid this as much as possible, once you have finished reading.

APPENDIX 2

Comprehension Tests Before the Standardization

1. First Year
2. Fourth-Year Science
3. Fourth-Year Arts
4. Fourth Year Social Studies

G.C.E. AND FIRST YEAR

THE READING PASSAGE No.1

When Godfrey Cass returned from Mrs. Osgood's dance at midnight, he was not much surprised to learn that Dunstan had not come home. Perhaps Dunstan had not sold Wildfire, and was waiting for another chance. Godfrey's mind, however, was too full of Nancy Lammeter for him to give much thought to Wildfire and Dunstan.

The next morning the whole village was excited by the story of the theft, and Godfrey, like everyone else, was busy talking over the news and visiting the Stone-pits. The rain had washed away all possibility of their discovering any foot-marks.

But a close examination of the spot had shown a little tinder-box, half sunk in the mud. It was not Silas's tinder-box, for the only one he had ever had was still in use. The opinion generally accepted was that the tinder-box in the mud was somehow connected with the theft.

A careful examination of the mystery was carried on by Mr. Crackenthorp, Squire Cass, and other people of importance. Mr. Snell, the inn-keeper, had just remembered that a pedlar had stopped for a drink at the inn about a month before. This pedlar had actually said to Mr. Snell that he carried a tinder-box about with him to light his pipe. Here surely was something to be examined very carefully. Mr. Snell said that the pedlar had "an evil look in his eye." The man didn't say anything of any interest. But then, it wasn't what the man said, it was the way he said it.

QUESTIONS ON READING PASSAGE No. 1

1. Who did Godfrey meet at Mrs. Osgood's dance?

2. Who was Godfrey in love with?

3. What took place at Stone-pits on the night of Osgood's dance?

4. What news was Godfrey talking over?

5. What did the rain wash away?

6. What spot was closely examined?

7. Near what place was the tinder-box found?

8. Why was the tinder-box connected with the theft?

9. What mystery was carefully examined?

10. What was interesting in Mr. Snell's statement concerning the pedlar?

Answer Sheet to Reading Passage No. 1.

1. . . .

2. . . .

3. . . . . . .

4. . . . . . .

5. . . .

6. . . . . . .

7. . . . . . .

8. . . . .

9. . . . . . .

10. . . . .

THE READING PASSAGE No. 2

"Foolish deeds! It's time for you to stop all this foolishness," said the Squire angrily. "I'm not going to pay for your foolishness any longer. It's time for you to begin to help me in managing our business affairs."

"Well, sir, I've often offered to take over the management of your affairs. But you know you did not like it and always seemed to think I wanted to take advantage of you."

"I remember nothing of that," said the Squire, "but I know that at one time you seemed to think of marrying. I did not stop you, as some fathers would. I'd rather you married Lammeter's daughter than anybody else. She hasn't refused you, has she?"

"No," said Godfrey, feeling hot and uncomfortable, "but I don't think that she will marry me."

"Why haven't you the courage to ask her?"

"I'd rather not do anything at present," said Godfrey in alarm. "I think she's a little offended with me just now. I hope you won't try to hurry it on by saying anything about it to Mr. Lammeter."

"I shall do what I choose," said the Squire. "Tell them to get my horse ready. And get that horse of Dunstan's sold, and hand me the money, will you? And if you know where Dunstan is hiding, you may tell him to spare himself the journey of coming back home. He shall never enter this house again."

Godfrey left the room. A new fear had come into his mind, the fear that his father might speak to Mr. Lammeter.

Questions on the Reading Passage No. 2

1. How did Godfrey act?

2. What did the Squire think Godfrey was?

3. Did the Squire think that his own business and his son's were two different, two similar, one and the same business, or two separate businesses?

4. Godfrey thought his father did not let him take over his business affairs because .... What?

5. What makes you think Godfrey thought his father's business affairs quite different from his own?

6. Do you think Godfrey has, has not, or may or may not have, offered to take over the management of his father's affairs?

7. Do you think the Squire's tone of speech was softened somewhere in the passage? If so, in what paragraph?

8. Was Godfrey willing, reluctant, careless or frightened to discuss marriage with his father?

9. Is the Squire a cruel, a friendly, a domineering, or an understanding sort of father?

10. What was the effect of the Squire's answer, "I shall do what I choose", on Godfrey?

Answer Sheet to Reading Passage No. 2

1. . . .

2. . . .

3. . . . .

4. . . . .

5. . . . .
. . . .

6. . . . .

7. . . .

8. . . .

9. . . .

10. . . .

THE READING PASSAGE NO. 3

It was seven o'clock, and by this time she was not very far from Raveloe, but she was not familiar enough with those lanes to know how near she was to her journey's end. She needed comfort, and she knew but one comforter - the drug; but she paused a moment after taking out the dark bottle before she raised it to her lips. In another moment Molly had thrown something away - it was an empty bottle. And she walked on again in the freezing wind which had sprung up since the snow had ceased. But she walked more and more sleepily, with the sleeping child held tightly in her arms.

Slowly the drug was working; cold and weariness were its helpers. Soon she felt nothing but a very great desire to lie down and sleep. She wandered on.

The sky cleared. The stars came out and shed a faint, silvery light upon the whiteness of the snow. But Molly's eyes were dimmed; she saw nothing.

She wandered on, her knees bending beneath the weight of drugged sleep that was coming over her. She sank down against a bush. It made an easy head-rest; and the bed of snow, too, was soft. She did not feel that the bed was cold and did not care whether the child might wake and cry for her. But her arms had not yet loosened their hold and the little one slept on as if it were in its little bed.

Deep sleep came over her. The fingers lost their hold; the arms unbent; then the little head of the child fell back on the snow and the blue eyes opened wide on the cold freezing starlight.

Questions on Reading Passage No.3

1. How far was she from her journey's end?

2. What was she adicted to?

3. What did she drink?

4. What time of the year was it?

5. What time of the day was it?

6. Why was she walking sleepily?

7. Why did Molly sink down?

8. What kind of sleep came over her?

9. How did the child wake up?

10. How is the reader expected to feel about Molly?

Answer Sheet to Reading Passage No.3

1. . . . .

2. . . .

3. . . .

4. . . .

5. . . .

6. . . . .

7. . . . .

8. . . . . . .

9. . . . .

10. . . .

THE READING PASSAGE No. 4

When Marner's senses returned, he continued the action which had been stopped; he closed the door. He did not know how long the trance had lasted; he could not see, except that the light had grown dim and that he was cold and faint. He walked forward into the room, where the fire gave only a red uncertain glimmer. He seated himself in his chair beside the fire. He was bending down to put some more wood on the fire, when, to his weak sight, it seemed as if there were gold on the floor in front of him. Gold ! - his own gold ! - brought back to him as mysteriously as it had been taken away. For a few minutes he was unable to stretch out his hand and touch the treasure. The heap of gold seemed to shine and grow larger beneath his excited gaze. He leaned forward at last, and stretched out his hand; but instead of the hard coin his fingers touched soft, warm curls.

Silas fell on his knees and bent his head low to examine this wonderful thing: it was a sleeping child - with soft yellow curls all over its head. Could this be his little sister come back to him in a dream? Was it his little sister whom he had carried about in his arms for a year before she died, when he was a small boy without shoes? That was the first thought that came into Silas's confused mind.

The child was very much like his little sister. Silas sank into his chair powerless to do anything, so great was the surprise and rush of past memories to his mind. How and when had the little child come in without his knowledge? He had never been beyond his door.

Questions on Reading Passage No. 4

1. What action was stopped by Marner's loss of his senses?

2. How many times did Marner attempt to close the door?

3. How long had the trance lasted?

4. Where was Marner standing when he noticed the light had grown dim and he was cold and faint?

5. Had Marner found or had he imagined gold on the floor of his cottage?

6. Was Marner happy, sorry, shocked, or glad to think his gold was back?

7. What actually was the gold he saw?

8. Who did the child remind him of?

9. Why was Marner powerless to do anything, after he had discovered the child?

10. When do you think the child entered Marner's cottage?

Answer Sheet to Reading Passage No. 4

1. . . . .

2. . . .

3. . . .

4. . . . .

5. . . .

6. . . .

7. . . . . . .

8. . . . . . .

9. Because he was . . .

10. . . . .

THE READING PASSAGE No. 5

By this time, however, the ladies had come forward, eager to know what could have brought the weaver there under such strange circumstances.

"What child is it?" said several ladies at once.

"I don't know," answered Godfrey. "Some poor woman has been found in the snow, I believe; that is her child." Godfrey forced himself with a terrible effort to give this answer.

"You must leave the child here, Master Marner," said Mrs. Kimble.

"No - no - I can't part with it; I can't let it go," said Marner quickly. "It has come to me - I've a right to keep it."

The idea of having the child taken from him had come to Silas quite unexpectedly. His words came almost as a surprise to himself. A minute before he had no clear idea of what he was going to do with the child.

"Did you ever hear of such a thing!" said Mrs. Kimble, in gentle surprise, to her neighbour.

"Now, ladies, I must ask you to stand aside," said Dr. Kimble, angry at being called away from an evening's pleasure.

"It's not very pleasant having to go out in this weather, is it, Kimble?" said the Squire.

"No, it isn't," said Kimble. "Get me a pair of thick boots, Godfrey, will you? And let somebody tell Dolly Winthrop to go to Marner's cottage; she's the best woman to get."

The child began to cry and call for "Mamma". It was no longer attracted by the bright lights and smiling faces of the ladies, but it held tightly to Marner. Godfrey had come back with the boots; he felt the cry as if something were being torn from his heart.

"I'll go," said Godfrey hastily, eager for some movement. "I'll go and fetch Mrs. Winthrop."

Dr. Kimble set out with Silas and the child to go to the cottage.

Questions on Reading Passage No. 5

1. Did the ladies come forward because they were kind-hearted, active, troublesome, or curious?

2. Did Godfrey force himself to answer the ladies because he did not want to show he was: a) tired, b) excited, c) indifferent, or d) confused?

3. Was Marner surprised, pleased, annoyed, or offended with the idea of giving the child away?

4. How did Mrs. Kimble receive Marner's refusal to part with the child?

5. Who had to go out?

6. How was the weather?

7. Had the child been at all attracted by the lights?

8. Was Dolly Winthrop the best of all women, the best on such occasions, or the best of the available?

9. Does the idea of something being torn from Godfrey's heart on hearing the child crying make you think if Godfrey had: a) a very soft heart, b) perhaps some connection with the child, c) a tiring evening, or d) no previous experience?

10. Do you think Godfrey offered to go and fetch Mrs. Winthrop because he was: a) over active, b) helpful by nature, c) tired of being inside and wanted some fresh air, or d) restless.

Answer Sheet to Reading Passage No. 5

1. . . .

2.

3. . . .

4. . . . . . .

5. . . . . . .

6. . . .

7. . . .

8. . . . .

9.

10.

Answers to Questions on Reading Passage No. 1

1. Nancy

2. Nancy

3. A theft. (A robbery) [1]

4. The theft. (The robbery)

5. Foot-marks. (Footprints)

6. The Stone-pits.

7. The Stone-pits.

8. Because it was not Marner's

9. The theft.

10. The way he made his statement.

[1] Words between brackets are alternatives used only by English students.

Answers to Questions on Reading Passage No.2

1. Foolishly.

2. Foolish.

3. One and the same affair. (.... business)

4. His father did not trust him. (Wanted to take advantage of him)
(He might take advantage of him)

5. Because he said to his father 'your' not 'our'.

6. He many or may not.

7. Three.

8. Frightened.

9. Domineering.

10. Fear.

Answers to Questions on Reading Passage No.3

1. Not very far.

2. Drug.

3. Drug.

4. Winter.

5. Evening. (Night) (Dawn)[1]

6. The drug was working (Because of the drug).

7. The drug had worked.

8. Drugged sleep. (Deep sleep).

9. Her head fell on the snow.

10. Sorry. (Sad) (Sympathetic) (Pity).

1. 'Dawn' was accepted because 7 o'clock is dawn in England, while it is morning in Iraq.

Answers to the questions on Reading Passage No.4

1. Closing the door.

2. Twice.

3. Unknown.

4. By the door. (In the doorway), (Near the door), (At the door)

5. Imagined.

6. Shocked.

7. Golden hair. (Golden curls)

8. His sister.

9. Surprised. (Dazed)

10. When he (Silas) had had a trance. (Before Marner's senses had returned), (When he (Marner) was in a trance)

Answers to the questions on Reading Passage No.5

1. Curious.

2. b) excited.

3. Surprised.

4. With (gentle) surprise.

5. Dr. Kimble. (The Doctor)

6. Bad. (Cold) (Unpleasant) (Snowy) (Snowing) (Terrible)

7. Yes.

8. The best on such occasions. (The best of the available)

9. b) Perhaps some connection with the child.

10. d) Because he was restless.

THE READING PASSAGE No. 1

Diamagnetism is the induced megnetism, in opposition to the inducing field, which is shown by non-magnetic materi als when they are placed in a magnetic field. An atom of diamegnetic material has no permanent magnetic moment in the absence of the magnetic field, and so presumably the magnetic moment of the occupied orbitals cancel each other out and the electron spins are paired (each pair consisting of two spins, one in the opposite direction to the other). Hence there must be an even number of electrons in each atom, ion, or molecule of which the diamagnetic material is composed. When an external magnetic field is applied, the occupied orbitals are either speeded up or retarded according to their direction of rotation, and this causes a resultant magnetic moment in the atom. During the short time interval between the instant of application of the magnetic field and the instant when it reaches its maximum value, the field is changing and therefore an electromotive force is induced in the atom. The induced currents which flow in the atom as a result of this electromagnetic induction must be carried by the electrons. Since $i = \epsilon w/2\pi$ a change of i causes a change of w and hence a change of magnetic moment.

According to Lenz's law, the induced magnetic field opposes the external magnetic field. As there is no electrical resistance in the atom, the extra current continues to flow, and the induced magnetism persists as long as the external field is applied. When the field is cut off, the atom loses its magnetism as a result of the reverse process from that which came into operation when the external field was set up. All atoms show diamagnetism whether they have paired or unpaired electrons, but for those which have a permanent magnetism the diamagnetic effect is masked.

Questions on Selection No. 1

1. What would you get when you place non-magnetic materials in a magnetic field?

2. How would you make an atom of diamagnetic material have a permanent magnetic moment?

3. What would happen to the magnetic moments of the occupied orbital in an atom of a diamagnetic material, if the external magnetic field were cut off?

4. What makes the occupied orbitals either speed up or slow down when an external magnetic field is applied?

5. What are the carriers of the induced currents in an atom?

6. What would you change in this equation $i = e^{w}/2\pi$ in order to change a magnetic moment?

7. What would make the current flow out of the atom?

8. In what kind of atoms is the diamagnetic effect masked?

Answer Sheet to Reading Passage No. 1

1. . . .

2. . . .

THE READING PASSAGE No. 2

The following discussion is confined to atoms with LS coupling. In a strong magnetic field, the magnetic axes of atoms, whether paramagnetic or diamagnetic, lie as much as possible along the direction of the field, and the resultant magnetic moment of all the atoms is a maximum. In the presence of a weak magnetic field, each atom experiences a couple which directs its orientation with regard to the field direction, but which is not strong enough to bring the magnetic axes of all the atoms into line with the field. In this case which is interesting to the spectroscopist, since the Zeeman effect, that is, the splitting of each single line into several lines, is observed in a weak magnetic field.

Under these conditions, the position taken up by the vector J is determined by the value of the quantum number M which is analogous to the quantum number m governing the behaviour of a single atom in an external magnetic field.

M can take all values from + J to - J. For a given value of M, the direction of J makes a constant angle with the direction of the external field, and J precesses about this field direction. Where, in the absence of an external field, there was a single line in the spectrum corresponding to a transition to a state designated by a certain value of J, in the presence of the external field this line is split into a number of lines which correspond to the different energy values associated with change of values of M.

The number of lines into which the original line is split is governed by the selection rules for transitions. The rule ist hat J (and therefore M also) can change only by 0, $\pm$ 1 and the transition 0 $\rightarrow$ 0 is forbidden.

Questions on Selection No. 2

1. What does LS coupling mean?

2. Of what use would the atoms whose resultant magnetic moment is a maximum be to a spectroscopist?

3. If you were to observe the Zeeman effect, what kind of magnetic field would you choose?

4. Which of the following magnetic fields would be most interesting to a spectroscopist: a) A field that brings the magnetic axes of all the atoms into line with the field; b) A field that scatters the magnetic axes of all the atoms around the line of the field, c) A field in the presence of which an atom experiences a couple that directs its orientation with regard to the field direction, d) A field that leads the magnetic axes of all the atoms to the opposite direction of the field?

5. Whose name would you associate with the splitting of each single line into several lines?

6. Which of the following governs the behaviour of a single atom in an external magnetic field: a) vector J; b) Quantum number M; c) Quantum number m, d) Either 'M' or 'm'.

7. Which value of M's values helps the direction of J to make a constant angle with the direction of the external field?

8. What is this rule called?

   "J (and therefore M also) can change only by 0, $\pm$ 1 and transition 0 $\longrightarrow$ 0 is forbidden."

9. What is the task of the above mentioned rule?

Answer Sheet to Reading Passage No. 2

1. . . . .

2. . . . or . . . . . .

3. . . .

4.

5. . . .

6.

7. . . .

8. . . . .

9. . . . .

THE READING PASSAGE No. 3

Semi-conductors. These are substances with crystalline structures, which are insulators under normal conditions, but which may be made conducting by rise of temperature or by the presence of impurities. They are divided into two classes: (a) intrinsic semi-conductors, and (b) n and p semi-conductors.

Intrinsic semi-conductors. These are characterised by N (E) curves of the type shown in Fig. 6 11(b). The Brillouin zones do not overlap but are contiguous, and there are no partially filled zones. A small amount of energy, such as that acquired by thermal excitation, is sufficient to raise some of the electrons from the higher energy states of the filled zone to the lower energy states of the next zone, which has hitherto been empty. There are then two partially filled zones, and when an external electric field is applied some of the electrons can move into the unoccupied energy states. The heated substance therefore behaves as a conductor. Graphite is a well known example of an intrinsic semi-conductor, but there are not many such substances which have their brillouin zones exactly or very nearly contiguous without overlapping.

n and p semi-conductors. There are substances which are not conductors in the pure state, but which may be made conducting by the introduction of impurities. Their N (E) curves show small energy gaps, which contain energy levels due to the impurity.

Questions on Selection No. 3

1. What would you get when a semi-conductor is heated up?

2. The Brillouin Zones of a semi-conductor substance are normally not partially filled zones; what would you do to get two partially filled zones?

3. Where would some of the electrons of a semi-filled zone move, when an external electric field is applied?

4. What conducts the movement of the electrons when an external electric field is applied?

5. What kind of effect would an externally electric field have on the behaviour of a heated semi-conductor?

6. The Brillouin Zones of what substance are contiguous without overlapping? Name it.

7. In what state could the n and p semi-conductors become conductors?

8. Are the above mentioned semi-conductors called semi-conductors because, (a) Their power of conductivity is weak; (b) Their power of conductivity is effective only when an external electric field is applied; (c) Each of them consists of two semi-filled Brillouin Zones; (d) Each of them consists of two Brillouin Zones, one filled and one empty?

Answer Sheet to Selection No. 3

1. . . .

2. . . . . .

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8.

THE READING PASSAGE No. 4

The effect of a Coriolis force is felt by a man seated near the periphery of a rotating room when he attempts to move. If he is at a distance x from the centre of rotation, and then leans backwards so that his head is at a distance y from the centre of rotation (x y), he feels as if he has been dealt a blow on the side of the head. Since his angular velocity is constant, his linear velocity must increase with increasing distance from the centre of rotation, and thus a change from a distance x to a distance y involves an acceleration with its accompanying sensation of force. If a molecule is rotating and vibrating at the same time, Coriolis forces are brought into play since the vibration is along the "radius" of the angular motion. If the co-ordinates of the rotating molecule are referred to rotating axes, in order to translate these co-ordinates into the usual stationary Cartesian system,it is necessary to postulate an additional force which acts at right angles to the direction of vibration, and at right angles to the axis of rotation. If this compensatory force is introduced, the co-ordinates of the molecule referred to the rotating axes may be used in the equations as if the molecule were not rotating. When a diatomic molecule is considered, it is not necessary to introduce a Coriolis force, as such a force would merely rotate the molecule as a whole. With a linear polyatomic molecule, the Coriolis force distorts the centre relative to the rest of the molecule. When the rotation of the co-ordinates has been compensated by the introduction of the Coriolis force, it is found that the nuclei move in ellipses during a vibration instead of in straight lines. There is therefore a definite vibrational angular momentum associated with vibration; this is designated by the latter l and has appropriate selection rules. The effect of the coupling of the overall rotation with the Coriolis rotation is to produce a splitting of the lines which increases with increasing value of J since the Coriolis force increases with the speed of rotation. This effect is known as l-type doubling.

Questions on Selection No. 4

1. How would a man seated near the periphery of a rotating room feel on attempting to lean backwards from a distance X to a distance Y from the centre of rotation?

2. What kind of force does accompany the acceleration involved in a change from a distance X to a distance Y ?

3. Would the head of a person who, seated at a distance X from the centre of rotation in a rotating room, leans backwards to a distance Y be nearer to, or further from, the centre of rotation?

4. What would happen to Coriolis forces, when a molecule is rotating and vibrating at the same time?

5. What direction does the vibration of a molecule, which is rotating and vibrating at the same time, take?

6. Should the additional force, used to help the co-ordinates of the molecule referred to the rotating axes to be used in the equations as if the molecules were not rotating, act at right angles to:
(a) the direction of vibration; (b) the axis of vibration;
(c) neither; (d) both?

7. What force acts at right angles to the direction of vibration and at right angles to the axis of vibration?

8. What does l-type doubling produce?

9. What would the increasing force of a Coriolis do to the splitting times?

Answer Sheet to Selection No. 4

1. . . .

THE READING PASSAGE No. 5

The study of pure rotation spectra has been greatly facilitated by the introduction of microwave technique. This was highly developed for use in connection with radar in the 1939-1945 war, and it has since been adapted for spectroscopic purposes. Most pure rotation spectra lie in the far infrared region where the radiation may be regarded either as very long wave length red waves, or as very short radio waves, according to the method used for their generation and detection. They are now almost exclusively studied by means of radio techniques and are therefore referred to as microwaves, since from the point of view of a radio operator they are of very short wave length; the range of wave length is about 1 mm to 30 cm. If microwave methods are used, the resolution of the lines in the spectrum is very much greater than that obtained by the older methods of infrared analysis.

Microwave experiments may be divided into two classes; gaseous microwave spectroscopy and paramagnetic resonance. Gaseous microwave spectroscopy is concerned with changes of rotational energy of the molecules of a gas which is subjected to radiation of critical frequency. Paramagnetic resonance spectra are obtained when substances whose molecules contain one or more unpaired electrons are placed in a magnetic field and subjected to radiation of microwave frequency. The spin magnetic moments of the unpaired electrons are coupled to the applied magnetic field and the absorption of microwave energy of just the right frequency causes transitions between the Zeeman levels. The substance investigated may be in the solid, liquid, or gaseous state. In microwave spectroscopy, the spectra observed are nearly always absorption spectra; a quantum of energy in the microwave region is very small and it is therefore not easy to produce satisfactory emission spectra.

Questions on Selection No. 5

1. When was the microwave technique developed?

2. Why was the microwave technique developed?

3. For what purposes is the microwave technique used nowadays.

4. What have been studied by means of radio technique?

5. Whose range of wave length is about 1mm to 30cm?

6. What methods had been used to study the pure rotation spectra before the microwave methods came into use?

7. What advantage do microwave methods have over the old method?

8. Do absorption spectra or emission spectra need a relatively higher quantum of energy?

Answer Sheet to Selection No. 5.

1. . . . .

2. . . . .

3. . . .

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7. . . . .

Answers to the questions on Selection No.1

1. Diamagnetism.

2. By applying a constant (external) magnetic field.

3. Would lose magnetism. (Would be cancelled) (reduce/decay to zero) (Would disappear).

4. Direction of rotation.

5. The electrons.

6. 'i'

7. Cut off of the magnetic field.

8. Atoms with permanent magnetism.(Those with permanent magnetic moments)

Answers to the questions on Selection No. 2

1. Line spectra splitting.

2. None, or no use.

3. Weak.

4. c) A field in the presence of which an atom experiences a couple that directs its orientation with regard to the field direction.

5. Zeeman.

6. d) Either m or M.

7. Any.

8. Selection rules for transitions.

9. It governs the number of lines into which the original line is split.

Answers to the questions on Selection No.3

1. Conductor.

2. Apply (give)(supply)heat (energy). (Add impurities.)

3. Unoccupied (vacant) energy states. (levels.)

4. Heat.

5. Conductive.

6. Graphite (semi-conductor)

7. Impure state.

8. d) Each of them consists of two Brillouin Zones, one filled and one empty.

Answer Sheet to questions on Selection No.4

1. As if he had had a blow on the side of his head.

2. Coriolis force.

3. Further.

4. Come into effect , (Brought into play) (Become effective) (Gain Power) (They act/appear)

5. Direction along the 'radius' of the angular motion.

6. (d) Both.

7. Coriolis force.

8. Splitting of lines.

9. Increases them.

Answers to the questions on Selection No.5

1. During the 1939/45 War.

2. For use of radar.

3. Spectroscopic.

4. Pure rotation spectra.

5. Radio, (Microwaves).

6. Infrared analysis.

7. Greater resolution of the lines in the spectrum.

8. Emission spectra.

THE READING PASSAGE NO. 1

And he answered: You give but little when you give of your possessions.

It is when you give of yourself that you truly give.

For what are your possessions but things you keep and guard for fear you may need them tomorrow?

And tomorrow, what shall tomorrow bring to the over-prudent dog burying bones in the trackless sand as he follows the pilgrims to the holy city?

And what is fear of need but need itself?

Is not dread of thirst when your well is full, the thirst that is un-quenchable?

There are those who give little of the much which they have and they give it for recognition and their hidden desire makes their gifts unwholesome.

And there are those who have little and give it all.

These are the believers in life and the bounty of life, and their coffer is never empty.

There are those who give with joy, and that joy is their reward.

And there are those who give with pain, and that pain is their baptism.

And there are those who give and know not pain in giving, nor do they seek joy, nor give with mindfulness of virtue;

They give as in yonder valley the myrtle breathes its fragrance into space.

Through the hands of such as these God speaks, and from behind their eyes He smiles upon the earth.

Questions on Reading Passage No. 1

1. What is the true meaning of giving?

2. Of what use are the possessions one keeps and guards according to the meaning expressed in the passage?

3. What is real need in the writer's point of view?

4. What is the rich man's form of need compared to?

5. What spoils the act of giving?

6. Who are the believers in life?

7. What givers experience a kind of purification?

8. What kind of giving is implied by 'the myrtle'?

9. What kind of giving does the writer favour most of all?

10. Suggest a suitable title for the passage.

Answer Sheet to Passage No. 1.

1. . . . . or . . . .

2. . . .

3. . . . .

4. . . . .

THE READING PASSAGE No. 2

And he answered, saying: You work that you may keep pace with the earth and the soul of the earth.

For to be idle is to become a stranger unto the seasons, and to step out of life's procession that marches in majesty and proud submission towards the infinite.

When you work you are a flute through whose heart the whispering of the hours turns to music.

Which of you would be a reed, dumb and silent when all else sings together in unison?

Always you have been told that work is a curse and labour a misfortune.

But I say to you that when you work you fulfil a part of earth's furthest dream, assigned to you when that dream was born,

And in keeping yourself with labour, you are in truth loving life,

And to love life through labour is to be intimate with life's inmost secret.

But if you in your pain call birth an affliction and the support of the flesh a curse written upon your brow, then I answer that naught but the sweat of your brow shall wash away that which is written.

You have been told also that life is darkness, and in your weariness you echo what was said by the weary.

And I say that life is indeed darkness save when there is urge,

And all urge is blind save when there is knowledge.

And all knowledge is vain save when there is work.

And all work is empty save when there is love;

And when you work with love you bind yourself to yourself, and to one another, and to God.

Questions on Reading Passage No. 2

1. What words in the first two sentences express the opposite of 'step out of life's procession'?

2. What word in sentence two expresses 'the soul of the earth'?

3. What does the image of 'a flute' represent for the writer?

4. What does the writer mean by a dumb and silent reed?

5. What misconceptions (ideas) about work are put into our minds?

6. How can one learn the secret of life?

7. What prevents vain knowledge?

8. Which of the following is closest to the writer's meaning as expressed in the passage ?

   (a) Life will become more tolerable if we work with each other in unison.

   (b) Work, like music, gives pleasure.

   (c) Work, with or without love, is to develop.

   (d) Work is essential to the understanding and fulfilment of life.

Answer Sheet to Reading Passage No. 2

1. . . . .

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or

. . . .

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Reading Time

mins. secs.

Answering Questions

mins. secs.

THE READING PASSAGE NO. 3

We all sat silent as if Selma had brought into the room with her a heavenly spirit worthy of mute respect. As she felt the silence she smiled at me and said, "Many a time my father has repeated to me the stories of his youth and of the old days he and your father spent together. If your father spoke to you in the same way, then this meeting is not the first one between us."

The old man was delighted to hear his daughter talking in such a manner and said, "Selma is very sentimental. She sees everything through the eyes of the spirit." Then he resumed his conversation with care and tact as if he had found in me a magic charm which took him on the wings of memory to the days of the past.

As I considered him, dreaming of my own later years, he looked upon me, as a lofty old tree that has withstood storms and sunshine throws its shadow upon a small sapling which shakes before the breeze of dawn.

But Selma was silent. Occasionally, she looked first at me and then at her father as if reading the first and last chapters of life' s drama. The day passed fast in that garden, and I could see through the window the ghostly yellow kiss of sunset on the mountains of Lebanon. Farris Effandi continued to recount his experiences and I listened entranced and responded with such enthusiasm that his sorrow was changed to happiness.

Selma sat by the window, looking on with sorrowful eyes and not speaking, as though beauty has its own heavenly language, loftier than the voices of tongues and lips. It is a timeless language, common to all humanity, a calm lake that attracts the singing rivulets to its depth and makes them silent.

Questions on Reading Passage No. 3

1. What was the effect of Salma's entrance into the room on her father and the writer?

2. Did Salma think that she might meet the writer because: (a) She loved him at first sight; (b) He lived near where they lived; (c) She thought he loved her; (d) She thought they were similar in their outlooks as the result of the ideas put into their heads by their fathers?

3. What did the writer remind the old man of?

4. Who was like a lofty old tree?

5. Was the writer resembled to the first chapter of life's drama because: (a) he was naive; (b) he was ambitious; (c) He was in love; (d) He was a born actor?

6. What time of the day is the writer describing?

7. What does he mean by, 'I considered him'?

8. What is a timeless language?

Reading Time

Mins. Secs.

Answering Questions

Mins. Secs.

Answer Sheet to Reading Passage No. 3

1. . . .

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THE READING PASSAGE No. 4

One day Farris Effandi invited me to dinner at his home. I accepted, my spirit hungry for the divine bread which Heaven placed in the hands of Selma, the spiritual bread which makes our hearts hungrier the more we eat of it. It was this bread which Kais, the Arabian poet, Dante, and Sappho tasted and which set their hearts afire; the bread which the Goddess prepares with the sweetness of kisses and the bitterness of tears.

As I reached the home of Farris Effandi, I saw Selma sitting on a bench in the garden resting her head against a tree and looking like a bride in her white silk dress, or like a sentinel guarding that place.

Silently and reverently I approached and sat by her. I could not talk; so I resorted to silence, the only language of the heart, but I felt that Selma was listening to my wordless call and watching the ghost of my soul in my eyes.

In a few minutes the old man came out and greeted me as usual. When he stretched his hand towards me, I felt as if he were blessing the secrets that united me and his daughter. Then he said, "Dinner is ready, my children; let us eat." We rose and followed him, and Selma's eyes brightened; for a new sentiment had been added to her love by her father's calling us his children.

We sat at the table enjoying the food and sipping the old wine, but our souls were living in a world far away, we were dreaming of the future and its hardships.

Three persons were separated in thoughts, but united in love; three innocent people with much feeling but little knowledge; a drama was being performed by an old man who loved his daughter and cared for her happiness, a young woman of twenty looking into the future with anxiety, and a young man, dreaming and worrying, who has tasted neither the wine of life nor its vinegar, and trying to reach the height of love and knowledge but unable to lift himself up. We three sitting in twilight were eating and drinking in that solitary home, guarded by Heaven's eyes, but at the bottom of our glasses were hidden bitterness and anguish.

Questions on Reading Passage No. 4

1. What does the writer mean by the 'divine bread'?

2. Did the writer accept the invitation because: (a) He wanted to meet Faris Effandi's daughter; (b) He was in love with Faris Effandi's daughter; (c) He wanted to meet people; (d) He was longing for love?

3. What was Kais besides being a poet?

4. What is the language of love?

5. How could you tell that Salma responded to the writer's feelings?

6. Where could she read his feelings?

7. What difficulties did the writer experience?

8. Were they a sort of religious, intellectual, imaginative, or down to earth people?

Answer Sheet to Reading Passage No. 4

1. . . .

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or

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Reading Time

mins. secs.

Answering Questions

mins. secs.

READING PASSAGE NO. 5

A SELECTED PIECE OF POETRY

1. Would that Hind had fulfilled to us her promise,
and healed our souls of their suffering !

2. Would that she had acted independently for once !
It is the weakling who does not act independently.

3. They asserted that she asked our lady-neighbours,
when she stripped herself one day to bathe,

4. "Do you see me to be as he describes me - in God's
name answer truly ! - or does he not observe moderation?"

5. Then they laughed together, saying to her, "Fair in
every eye is the one you love !"

6. (So they spoke) out of an envy with which they were
charged because of her; and of old envy has existed
amongst men.

7. A young maiden (is she) who, when she discloses her
cool lips, there is revealed from them (teeth white as)
camomile-blossoms or hailstones.

8. She has two eyes whose lids contain an intense white-
ness and blackness, and her neck is a slender softness.

Questions on the Reading Passage No. 5

1. Is the poet happy, aggressive, unhappy, or indifferent?

2. Had Hind a strong, a weak, a domineering, or a playful personality?

3. Which of the following statements made about Hind is true? (a) Hind bathes always with her lady-neighbours; (b) Hind is bathing with her lady-neighbours now; (c) Hind is bathing in the presence of an audience of her lady-neighbours; (d) Hind bathed to show her beautiful body to her lady neighbours?

4. Did Hind's lady-neighbours imply in line five that she was very pretty, not pretty at all, pretty, or may or may not have been pretty?

5. Did the ladies mean by 'Fair in every eye is the one you love!' that (a) Everyone loves someone who is beautiful; (b) The beloved is always beautiful; (c) Your lover loves you because you are beautiful; (d) When one loves somebody, one thinks she is very beautiful.

6. Did the poet think the ladies were just, unfair, ignorant, or joking by saying what they said in line five?

N. B. The answer sheet will contain only the numbers of the questions.

Answer Sheet to Reading Passage No. 5

1.

2.

3.

4.

5.

6.

Reading Time

mins. secs.

Answering Questions

mins. secs.

Answers to questions on Reading Passage No. 1

1. When you give of yourself. (Giving of yourself)

2. None. (Useless)

3. Fear of need.

4. Dread of thirst when the well is full.

5. Desire for recognition (hidden desire). (Giving for purpose)

6. Those who - (have little and) - give all.

7. Those who give with pain.

8. Giving freely. (Spontaneous giving) (Unselfish, without motivation)

9. The last, unconscious giving.

10. Giving. (Generosity)

Answers to questions on Reading Passage No. 2

1. 'Keep pace with the earth'.

2. Infinite.

3. One who works. (When you work) (A working man)

4. An idle person, or, One who doesn't work. (Not working)

5. Work is a curse and a misfortune.

6. Loving life through work. (Loving life through labour)

7. Work with love. (Work and love)

8. d) Work is essential to the understanding and fulfilment of life.

Answers to questions on Reading Passage No. 3

1. Silence. (Calming)

2. d) She thought they were similar in their outlooks as the result of the ideas put into their heads by their fathers.

3. His youth. (His past) (Past days)

4. Salma's father. (The old man) (Farris Effandi)

5. a) Naive.

6. Sunset. (Evening)

7. Watched him thoughtfully. (Looked at him) (Listened to him)

8. Silence. (Beauty)

Answers to questions on Reading Passage No. 4

1. Love.

2. (d) Because he was longing for love.

3. A lover.

4. Silence.

5. He felt it; (He said it) (Her eyes brightened)

6. (Reflected) in his eyes.

7. None.

8. Imaginative.

Answers to questions on Reading Passage No. 5

1. Unhappy. (Aggressive)

2. Weak.

3. (c) Hind is bathing in the presence of an audience of her lady-neighbours.

4. May or may not have been pretty.

5. (d) When one loves somebody, one thinks she is beautiful.

6. Unfair.(Unjust).

SOCIAL STUDIES

THE READING PASSAGE No. 1

Agriculture, Mining, Fishing and Forestry belong to a class known as "Extractive Occupations", and a little consideration of what we have said will make it obvious that an extractive occupation is one in which man obtains either what Nature has provided absolutely, as in the case of the gold or the blackberries; or what Nature has provided with more or less of man's assistance, as in the case of crops such as wheat or fruits. In the case of Mining, the reader will realize that once the stock of gold, coal, iron, etc., is exhausted, nothing that man can do will make further mining possible there. On the other hand, man can do much in the other cases to prevent the exhaustion of, and even to add to supplies. He can add nourishment to the soil by using fertilizers and by refraining from growing the same crop in the same soil year after year; he can plant trees and leave Nature to rear them; and he can see that trees are not cut down wantonly; he can refrain from fishing in seas which are showing signs of exhaustion and so give time for the stock to replenish itself; or he can even introduce fish brought from other waters to increase the stock.

Raw materials provided by extractive workers are of little use, however, if they remain in the spot where they are produced: they must be taken to those who can change the form of the materials to make the things that people require. Tobacco is grown in Virginia, as we have mentioned, but it must be changed into cigarette form before such people as our friend Brown can have their wants satisfied. The majestic oak-tree may cause admiration when seen growing, but to see the tree growing will not be enough for the person who wishes to buy an oak table or oak chairs.

Questions on Reading Passage No. 1

1. What kind of worker is a farmer?

2. What are those extractive occupations whose productivity could be increased by manpower?

3. What materials is this passage dealing with?

4. Does an extractive occupation provide people with things ready (a) to be used, (b) to be exported, (c) to be changed in one way or another to satisfy their need, or (d) to be manufactured?

5. What do you call the act of planting trees and leaving them to grow naturally?

6. What use has an exhausted mine?

7. What would happen if men were not careful in cutting down trees from a forest?

8. Would a soil, on which a particular crop is being planted for many years in succession, (a) gain nourishment, (b) increase its product, (c) become completely useless, or (d) lose fertility?

Answer Sheet to Reading Passage No. 1

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THE READING PASSAGE No. 2

Our examination of the commercial group of occupations has given us the clue to the meaning we must give to the word "Commerce". The aim of all those engaged in Commerce is to distribute the whole of the raw and manufactured foodstuffs and products of the world so as to satisfy all our wants. The people of the British Isles require the fruits and rubber which can only be obtained in tropical lands; the teas, the coffees and the rice of such countries as India and China and Brazil. In other words, we require things which we cannot produce for ourselves. Some of us prefer to have the laces of Venice rather than those of Nottingham; or the Italian motor-car rather than a British car. So we also bring into our country things which we ourselves can produce. To get all these things to the place in which they are required is the task of the commercial workers. Hence, Commerce includes not only the buying and the selling of the goods, whether at home or abroad, but also all other work which makes that buying and selling possible or easier and which enables what has been bought or sold to be moved to the required places. The mere buying and selling we may term "Trade", and when we speak of "Trade" therefore we must realize that it is merely a branch of "Commerce". Banking makes it possible to pay for goods purchased abroad almost as easily as for those bought at home, whilst Insurance removes the risks which always exist when things are sent by land or by water to their destination; and Transport makes it possible to get the goods moved from one place to another. Without any one of these - Trade, Banking, Insurance and Transport - Commerce would be either impossible altogether or ever so much more difficult; many of the wants of mankind would have to go unsatisfied.

Questions on Reading Passage No. 2

1. Did Commerce get its meaning through: (a) analysing the elements of trade, (b) examining the tasks of commercial workers, (c) studying the needs of people, or (d) improving means of transportation?

2. Does rubber need: (a) a humid and hot, (b) a humid and fairly hot, (c) a dry and hot, or (d) a Mediterranean climate?

3. What is Nottingham famous for?

4. Does Commerce deal with the act of buying and selling: (a) at home, (b) abroad, (c) both, or (d) locally?

5. What name would you give to the mere act of buying and selling?

6. If you were a powerful, wicked person, how would you stop people from satisfying their needs?

7. Would you draw a diagram to show the meaning of Commerce and Trade?

8. Which of the following titles is the most suitable for this passage? (a) The products of hot countries; (b) Commerce; (c) Commerce and Trade; (d) The elements of Commerce.

Answer Sheet to Reading Passage No. 2

1.

2.

3. . . .

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8. . . . .

THE READING PASSAGE No. 3

Every retailer does all in his power to get customers into his shop. The success of his business depends to a great extent on his success in this direction. Often he has to work exceptionally hard to get customers and, frequently, to work harder still to keep them. By his own personal efforts he builds up, maybe very gradually and laboriously, a "business connection", that is a number of people on whose custom he can rely. These people are really the basis of his success. Other customers - casual customers - may call at his shop and buy but they do not make a regular habit of doing so. They help to swell the sales of the retailer but he cannot rely on them in the same way that he can rely on his regular customers. Hence when he sells his shop he says to himself, quite naturally, "Why should I have to hand over this regular trade, to get which I have worked long and hard, and not receive any payment for it?" But the intending buyer, to whom he can prove the existence of such regular customers, is not likely to object to paying something for these customers, or, rather, for the probability that they will continue to buy at the shop despite a change in the ownership. We may say, therefore, that, when we say a certain sum is paid for the goodwill of a business, we mean that it is paid as compensation or reward to the seller for past efforts; for the reputation and the connection he has worked up in the locality by those efforts. Payment for the goodwill of a business will consequently vary from case to case. In some cases where the retailer has let his business decay, the goodwill will be worth nothing; in other cases where the business is a very thriving one the goodwill will be exceedingly valuable and will constitute quite a good percentage of the total sum paid by the buyer for shop, stock, and goodwill.

Questions on Reading Passage No. 3

1. On what does the success of a retailer's business depend?

2. What does the "business connection" of a retailer consist of?

3. Does the casual customer help the retailer: in establishing a "business connection"; increasing his sales; making his task of attracting customers easier, or making the task of keeping customers harder?

4. What would a retailer, who is selling his shop, expect for the goodwill of his business?

5. Does a buyer pay the retailer a sum of money for his regular customers because (a) he hopes the customers will continue to buy at the shop, (b) he wants to reward the retailer; (c) he thinks he has to do so as a rule, or (d) he wants to win the retailer's confidence?

6. Is a very successful business valuable, valueless, extremely valuable, or invaluable?

7. Does the "goodwill" of a retailer's business mean that the retailer is: honest, successful in business, lending money with interest, or easy to communicate with?

8. Does the payment for the "goodwill" of a business represent (a) a very high percentage, (b) a reasonably high percentage, (c) a low percentage, or (d) a very low percentage of the total sum of the money paid for the purchases of the shop?

Answer Sheet to Reading Passage No. 3

1. . . . or . . . .

2. . . . . .

3. . . . .

4. . . .

5.

6. . . . . .

7. . . . .

8.

THE READING PASSAGE No. 4

In some localities business may be carried on entirely on a cash basis; the people are accustomed and prepared to pay for the goods they buy when they buy them. But in some areas, the customer expects to be given credit. Giving credit is equivalent to lending money and the retailer who has to give credit largely will find that he has less money to make further purchases than he would have if he received cash down for the goods he sells. Thus if the business is going to be largely or wholly a credit one, the buyer will require all the more capital to make it a success.

The buyer, again, will always consider whether the premises offered to him are suitable both in form and in size; or whether they can be altered to suit his needs without too heavy expense if they are not suitable. Some buyers like to feel, moreover, that they have space for extending their premises sooner or later, and especially if their intention is to build up a departmental store.

Clearly, too, the buyer will wish to know what he will have to pay annually in the way of rent, rates, taxes and the like. And, as some shops are let on lease, that is for a number of years only, the buyer will take the precaution in such cases of finding out how many years of the lease have still to run. He will not desire to take over a shop this year from which he may be turned out next year owing to the fact that the term of years is up.

Questions on Reading Passage No. 4

1. Does giving credit mean: a) lending the customers money; b) selling them goods on loan; c) giving them discounts, or d) lending them money for interest?

2. Does the word "buyer" in the second paragraph mean: a) a cash customer, b) a credit customer, c) the customer of the retailer, or d) a buyer of a business?

3. What does premises mean in this passage?

4. The writer is describing things which are important for a person to think of when about to set up as a ..... What?

5. A relatively big capital is important for a business run on a ..... What?

6. What does "to let a shop on lease" mean?

7. Is it the first, the second, the third, or the fourth sentence which is the key (the most important) sentence of the first paragraph?

8. If you were a retailer about to set up a business, which of the following would you first take into consideration:

(a) The size and form of the premises?
(b) The locality of the premises?
(c) The expenses to be paid for rates, rent, and taxes?
(d) The system according to which the premises are let?

Answer Sheet to Reading Passage No.4

1.

2.

3. . . .

4. . . .

5. . . . . . .

6. . . . . .

THE READING PASSAGE No. 5

The wholesale trader may be described as one who buys in large quantities from the makers or producers and who sells in smaller quantities to the retailers. The reader must not infer, however, that wholesalers limit themselves to that work and to that alone. We need only look around us in our towns and we shall find instances of traders who describe themselves as wholesale and retail dealers in tobacco, or fruit, or vegetables. But though the traders in question are prepared to sell their goods to the public as well as to retailers, they do buy in large quantities from the makers and sell in smaller quantities to retailers. The only difference is that they will sell in small quantities to anyone whereas most wholesalers will only deal with retail traders.

In an earlier chapter we have emphasized the importance of buying well in the retailer's case. What was said there applies with even greater force in the case of the wholesaler. Attention has also been drawn to the importance of attracting and retaining customers in the retail trade. In the wholesale trade that, too, is equally important. Consequently the wholesaler is invariably one who has made buying and selling a real art: he is an expert in both. And since he has made a deep study of these things he is well fitted for another side of his work, viz: that of advising the retailers who buy from him. The wholesaler is in a far better position for obtaining an idea of the state of trade in general at first hand, for his dealings cover the entire country whereas those of the majority of retailers are confined to a small area.

Questions on Reading Passage No. 5

1. Do all, some, most, or few wholesalers deal with retailers?

2. Do fruit wholesalers sell only: a) to retailers, b) to the public, c) to a certain class of the public, or d) to all?

3. What is it that is of great importance to the wholesalers?

4. What does the second 'that' in the fourth line of the first paragraph refer to?

5. In what is a wholesaler an expert?

6. What sort of help could a wholesaler offer a retailer?

7. How vast an area do the wholesaler's dealings cover?

8. Which of the following titles suits best the passage you have just read?

   (a) Some advice to traders.
   (b) The responsibilities of wholesalers and retailers.
   (c) The wholesaler and his work.
   (d) The difference between a wholesaler and a retailer.

Answer Sheet to Reading Passage No. 5

1. . . .

2.

3. . . . . .

4. . . . .

Answers to questions on Reading Passage No. 1

1. An extractive worker.

2. Agriculture, Fishing and Forestry.

3. Raw (natural).

4. (c) Things ready to be changed in one way or another to satusfy their needs.

5. Forestry. (Afforestation) (Reafforestation)

6. None.

7. The forest would be exhausted. (Depleted) (No forest would be left)

8. (d) Lose fertility.

Answer Sheet on Reading Passage No. 2

1. (b) Examining the tasks of commercial workers.

2. (a) A humid and hot.

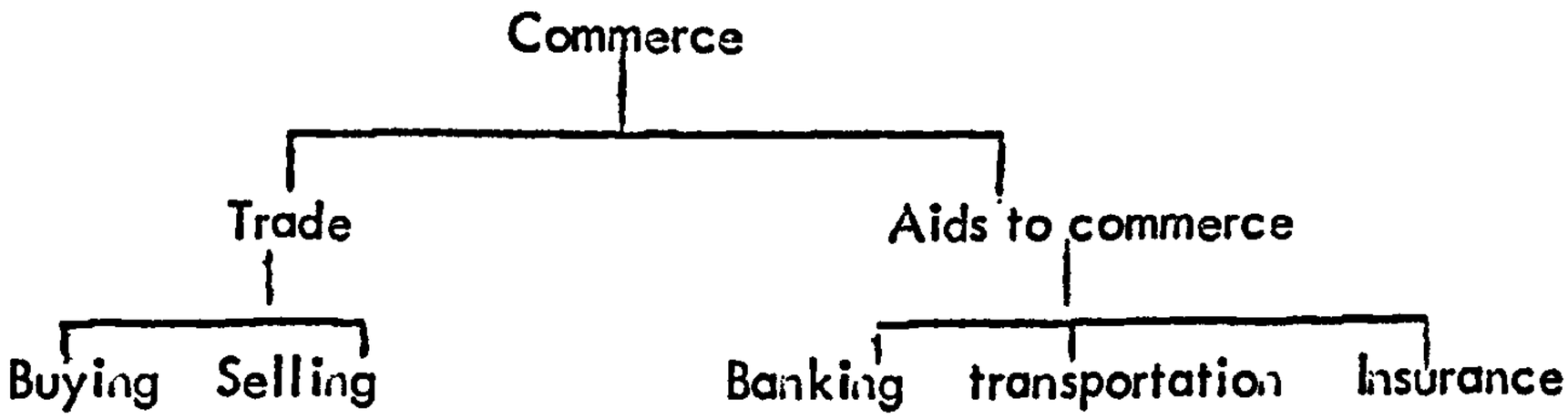
3. Lace.

4. Both.

5. Trade.

6. Stop commerce (trade). (Ban trade).

7.



8. The elements of commerce. (Commerce and trade)

Answers to questions on Reading Passage No. 3

1. Customers

   or

   His business connection.

2. Regular customers. (Customers' reliance) (Reliable customers)

3. Increasing his sales.

4. Money (payment) (cash)

5. (a) He hopes the customers will continue to buy at the shop.

6. Extremely valuable.

7. Successful in business.

8. (b) A reasonably high percentage.

Answers to the questions on Reading Passage No. 4

1. (b) Selling them goods on loan.

2. (d) A buyer of a business.

3. Shop.

4. Retailer.

5. Credit basis, (system).

6. To let it for a limited number of years only.

7. The fourth.

8. (b) The locality of the premises.

Answers to questions on Reading Passage No. 5

1. Most.

2. (d) To all.

3. Buying well.

4. Buying in large quantities, and selling in small.
(Buying from the makers and selling to retailers)

5. Buying and selling.

6. Advice.

7. Whole country. (Entire country)

8. (c) The wholesaler and his work.

APPENDIX 3

Final Forms of the Comprehension Tests

1. First Year

2. Fourth Year

   A. Sciences

   B. Arts

   C. Social Studies

THE READING PASSAGE NO. 1

It was seven o'clock, and by this time she was not very far from Raveloe, but she was not familiar enough with those lanes to know how near she was to her journey's end. She needed comfort, and she knew but one comforter - the drug; but she paused a moment after taking out the dark bottle before she raised it to her lips. In another moment Molly had thrown something away - it was an empty bottle. And she walked on again in the freezing wind which had sprung up since the snow had ceased. But she walked more and more sleepily, with the sleeping child held tightly in her arms.

Slowly the drug was working; cold and weariness were its helpers. Soon she felt nothing but a very great desire to lie down and sleep. She wandered on.

The sky cleared. The stars came out and shed a faint, silvery light upon the whiteness of the snow. But Molly's eyes were dimmed; she saw nothing.

She wandered on, her knees bending under the weight of drugged sleep that was coming over her. She sank down against a bush. It made an easy head-rest; and the bed of snow, too, was soft. She did not feel that the bed was cold and did not care whether the child might wake and cry for her. But her arms had not yet loosened their hold and the little one slept on as if it were in its little bed.

Deep sleep came over her. The fingers lost their hold; the arms unbent; then the little head of the child fell back on the snow and the blue eyes opened wide on the cold freezing starlight.

Questions on Reading Passage No. 1

1. What was she addicted to?

2. What did she drink?

3. What time of the year was it?

4. What time of the day was it?

5. What kind of sleep came over her?

Answer Sheet to Reading Passage No. 1

1. . . .

2. . . .

3. . . .

4. . . .

5. . . . . . .

THE READING PASSAGE No. 2

When Marner's senses returned, he continued the action which had been stopped; he closed the door. He did not know how long the trance had lasted; he could not see, except that the light had grown dim and that he was cold and faint. He walked forward into the room, where the fire gave only a red uncertain glimmer. He seated himself in his chair beside the fire. He was bending down to put some more wood on the fire, when, to his weak sight, it seemed as if there were gold on the floor in front of him. Gold ! - his own gold ! - brought back to him as mysteriously as it had been taken away. For a few minutes he was unable to stretch out his hand and touch the treasure. The heap of gold seemed to shine and grow larger beneath his excited gaze. He leaned forward at last, and stretched out his hand; but instead of the hard coin his fingers touched soft, warm curls.

Silas fell on his knees and bent his head low to examine this wonderful thing: it was a sleeping child - with soft yellow curls all over its head. Could this be his little sister come back to him in a dream? Was it his little sister whom he had carried about in his arms for a year before she died, when he was a small boy without shoes? That was the first thought that came into Silas's confused mind.

The child was very much like his little sister. Silas sank into his chair powerless to do anything, so great was the surprise and rush of past memories to his mind. How and when had the little child come in without his knowledge? He had never been beyond his door.

Questions on Reading Passage No. 2

1. What action was stopped by Marner's loss of his senses?

2. How long had the trance lasted?

3. Where was Marner standing when he noticed the light had grown dim and he was cold and faint?

4. Had Marner found or had he imagined gold on the floor of his cottage?

5. Who did the child remind him of?

Answer Sheet to Reading Passage No. 2

1. . . . .

2. . . .

3. . . . .

4. . . .

5. . . . . . .

THE READING PASSAGE No. 3

By this time, however, the ladies had come forward, euger to know what could have brought the weaver there under such strange circumstances.

"What child is it?" said several ladies at once.

"I don't know," answered Godfrey. "Some poor woman has been found in the snow, I believe; that is her child." Godfrey forced himself with a terrible effort to give this answer.

"You must leave the child here, Master Marner," said Mrs. Kimble.

"No - no - I can't part with it; I can't let it go," said Marner quickly. "It has come to me - I've a right to keep it."

The idea of having the child taken from him had come to Silas quite unexpectedly. His words came almost as a surprise to himself. A minute before he had no clear idea of what he was going to do with the child.

"Did you ever hear of such a thing!" said Mrs. Kimble, in gentle surprise, to her neighbour.

"Now, ladies, I must ask you to stand aside," said Dr. Kimble, angry at being called away from an evening's pleasure.

"It's not a very pleasant having to go out in this weather, is it, Kimble?" said the Squire.

"No, it isn't," said Kimble. "Get me a pair of thick boots, Godfrey, will you? And let somebody tell Dolly Winthrop to go to Marner's cottage; she's the best woman to get."

The child began to cry and call for "Mamma". It was no longer attracted by the bright lights and smiling faces of the ladies, but it held tightly to Marner. Godfrey had come back with the boots; he felt the cry as if something were being torn from his heart.

"I'll go," said Godfrey hastily, eager for some movement. "I'll go and fetch Mrs. Winthrop."

Dr. Kimble set out with Silas and the child to go to the cottage.

Questions on Reading Passage No. 3

1. Did the ladies come forward because they were kind-hearted, active, troublesome, or curious?

2. How did Mrs. Kimble receive Marner's refusal to part with the child?

3. Who had to go out?

4. How was the weather?

5. Does the idea of something being torn from Godfrey's heart on hearing the child crying make you think if Godfrey had: a) a very soft heart, b) perhaps some connection with the child, c) a tiring evening, or d) no previous experience.

Answer Sheet to Reading Passage No. 3

1.

2. . . . . . .

3. . . . . . .

4. . . .

5.

Answers to the Questions on Reading Passage No. 1

1. Drug.

2. Drug.

3. Winter.

4. Evening. (Night)

5. Drugged sleep. (Deep sleep)

Answers to the questions on Reading Passage No.2

1. Closing the door.

2. Unknown.

3. By the door, (In the doorway), (Near the door), (At the door)

4. Imagined.

5. His sister.

Answers to the questions on Reading Passage No.3

1. Curious.

2. With (gentle) surprise.

3. Dr. Kimble. (The Doctor)

4. Bad. (Cold) (Unpleasant) (Snowy) (Snowing) (Terrible)

5. b) Perhaps some connection with the child.

SCIENCES

THE READING PASSAGE No. 1

Diamagnetism is the induced megnetism, in opposition to the inducing field, which is shown by non-magnetic materi als when they are placed in a magnetic field. An atom of diamegnetic material has no permanent magnetic moment in the absence of the magnetic field, and so presumably the magnetic moment of the occupied orbitals cancel each other out and the electron spins are paired (each pair consisting of two spins, one in the opposite direction to the other). Hence there must be an even number of electrons in each atom, ion, or molecule of which the diamagnetic material is composed. When an external magnetic field is applied, the occupied orbitals are either speeded up or retarded according to their direction of rotation, and this causes a resultant magnetic moment in the atom. During the short time interval between the instant of application of the magnetic field and the instant when it reaches its maximum value, the field is changing and therefore an electromotive force is induced in the atom. The induced currents which flow in the atom as a result of this electromagnetic induction must be carried by the electrons. Since $i = \epsilon w/2\pi$ a change of i causes a change of w and hence a change of magnetic moment.

According to Lenz's law, the induced magnetic field opposes the external magnetic field. As there is no electrical resistance in the atom, the extra current continues to flow, and the induced magnetism persists as long as the external field is applied. When the field is cut off, the atom loses its magnetism as a result of the reverse process from that which came into operation when the external field was set up. All atoms show diamagnetism whether they have paired or unpaired electrons, but for those which have a permanent magnetism the diamagnetic effect is masked.

Questions on Selection No. 1

1. What would you get when you place non-magnetic materials in a magnetic field?

2. What would happen to the magnetic moments of the occupied orbital in an atom of a diamagnetic material, if the external magnetic field were cut off?

3. What are the carriers of the induced currents in an atom?

4. What would you change in this equation $i = \mathcal{E}^{w}/2\cdot\pi$ in order to change a magnetic moment?

5. In what kind of atoms is the diamagnetic effect masked?

Answer sheet to Reading Passage No. 1

1. . . .

2. . . . .

3. . . . .

4. . . .

5. . . . .

THE READING PASSAGE No. 2

The following discussion is confined to atoms with LS coupling. In a strong magnetic field, the magnetic axes of atoms, whether paramagnetic or diamagnetic, lie as much as possible along the direction of the field, and the resultant magnetic moment of all the atoms is a maximum. In the presence of a weak magnetic field, each atom experiences a couple which directs its orientation with regard to the field direction, but which is not strong enough to bring the magnetic axes of all the atoms into line with the field. In this case which is interesting to the spectroscopist, since the Zeeman effect, that is, the splitting of each single line into several lines, is observed in a weak magnetic field.

Under these conditions, the position taken up by the vector J is determined by the value of the quantum number M which is analogous to the quantum number m governing the behaviour of a single atom in an external magnetic field.

M can take all values from + J to - J. For a given value of M, the direction of J makes a constant angle with the direction of the external field, and J precesses about this field direction. Where, in the absence of an external field, there was a single line in the spectrum corresponding to a transition to a state designated by a certain value of J, in the presence of the external field this line is split into a number of lines which correspond to the different energy values associated with change of values of M.

The number of lines into which the original line is split is governed by the selection rules for transitions. The rule ist hat J (and therefore M also) can change only by 0, $\pm$ 1 and the transition 0 $\rightarrow$ 0 is forbidden.

Questions on Selection No. 2

1. If you were to observe the Zeeman effect, what kind of magnetic field would you choose?

2. Which of the following magnetic fields would be most interesting to a spectroscopist: a) A field that brings the magnetic axes of all the atoms into line with the field; b) A field that scatters the magnetic axes of all the atoms around the line of the field; c) A field in the presence of which an atom experiences a couple that directs its orientation with regard to the field direction; d) A field that leads the magnetic axes of all the atoms to the opposite direction of the field?

3. Whose name would you associate with the splitting of each single line into several lines?

4. Which of the following governs the behaviour of a single atom in an external magnetic field: a) vector J; b) Quantum number M; c) Quantum number m; d) Either M or m?

5. What is this rule called?

"J (and therefore M also) can change only by 0, $\pm$ 1 and transition 0 $\longrightarrow$ 0 is forbidden."

Answer Sheet to Selection No. 2

1. . . .

2.

3. . . .

4.

5. . . . .

THE READING PASSAGE No. 3

Semi-conductors. These are substances with crystalline structures, which are insulators under normal conditions, but which may be made conducting by rise of temperature or by the presence of impurities. They are divided into two classes: (a) intrinsic semi-conductors, and (b) n and p semi-conductors.

Intrinsic semi-conductors. These are characterised by N (E) curves of the type shown in Fig. 6 11(b). The Brillouin zones do not overlap but are contiguous, and there are no partially filled zones. A small amount of energy, such as that acquired by thermal excitation, is sufficient to raise some of the electrons from the higher energy states of the filled zone to the lower energy states of the next zone, which has hitherto been empty. There are then two partially filled zones, and when an external electric field is applied some of the electrons can move into the unoccupied energy states. The heated substance therefore behaves as a conductor. Graphite is a well known example of an intrinsic semi-conductor, but there are not many such substances which have their brillouin zones exactly or very nearly contiguous without overlapping.

n and p semi-conductors. There are substances which are not conductors in the pure state, but which may be made conducting by the introduction of impurities. Their N (E) curves show small energy gaps, which contain energy levels due to the impurity.

Questions on Selection No. 3

1. What would you get when a semi-conductor is heated up?

2. The Brillouin Zones of a semi-conductor substance are normally not partially filled zones; what would you do to get two partially filled zones?

3. Where would some of the electrons of a semi-filled zone move, when an external electric field is applied.

4. The Brillouin Zones of what substance are contiguous without overlapping? Name it?

5. In what state could the n and p semi-conductors become conductors?

Answer Sheet to Selection No. 3

1. . . .

2. . . . . . .

3. . . . .

4. . . .

5. . . . . . .

Answers to the Questions on Selection No. 1

1. Diamagnetism

2. Would lose magnetism. (Would be cancelled) (Reduce/decay to zero.) (Would disappear.)

3. The electrons.

4. 'i'

5. Atoms with permanent magnetism. (Those with permanent magnetic moments)

Answers to the questions on Reading Passage No. 2

1. Weak.

2. c) A field in the presence of which an atom experiences a couple that directs its orientation with regard to the field direction.

3. Zeeman.

4. d) Either m or M.

5. Selection rules for transitions.

Answers to the questions on Selection No.3

1. Conductor.

2. Apply (give) (supply) heat (energy). Add impurities.

3. Unoccupied (vacant) energy states. (levels.)

4. Graphite (semi-conductor)

5. Impure state.

ARTS

THE READING PASSAGE NO.1

And he answered: You give but little when you give of your possessions.

It is when you give of yourself that you truly give.

For what are your possessions but things you keep and guard for fear you may need them tomorrow ?

And tomorrow, what shall tomorrow bring to the over-prudent dog burying bones in the trackless sand as he follows the pilgrims to the holy city?

And what is fear of need but need itself?

Is not dread of thirst when your well is full, the thirst that is unquenchable?

There are those who give little of the much which they have and they give it for recognition and their hidden desire makes their gifts unwholesome.

And there are those who have little and give it all.

These are the believers in life and the bounty of life, and their coffer is never empty.

There are those who give with joy, and that joy is their reward.

And there are those who give with pain, and that pain is their baptism.

And there are those who give and know not pain in giving, nor do they seek joy, nor give with mindfulness of virtue;

They give as .in yonder valley the myrtle breathes its fragrance into space.

Through the hands of such as these God speaks, and from behind their eyes He smiles upon the earth.

Questions on Reading Passage No. 1

1. What is the true meaning of giving?

2. Of what use are the possessions one keeps and guards according to the meaning expressed in the passage?

3. What spoils the act of giving?

4. Who are the believers in life?

5. What kind of giving is implied by 'the myrtle'?

Answer Sheet to Passage No. 1

1. . . . . or . . . .

2. . . .

3. . . . . or . . . .

4. Those who . . . . . .

5. . . . . .

THE READING PASSAGE No. 2

And he answered, saying: You work that you may keep pace with the earth and the soul of the earth.

For to be idle is to become a stranger unto the seasons, and to step out of life's procession that marches in majesty and proud submission towards the infinite.

When you work you are a flute through whose heart the whispering of the hours turns to music.

Which of you would be a reed, dumb and silent when all else sings together in unison?

Always you have been told that work is a curse and labour a misfortune.

But I say to you that when you work you fulfil a part of earth's furthest dream, assigned to you when that dream was born,

And in keeping yourself with labour, you are in truth loving life,

And to love life through labour is to be intimate with life's inmost secret.

But if you in your pain call birth an affliction and the support of the flesh a curse written upon your brow, then I answer that naught but the sweat of your brow shall wash away that which is written.

You have been told also that life is darkness, and in your weariness you echo what was said by the weary.

And I say that life is indeed darkness save when there is urge,

And all urge is blind save when there is knowledge.

And all knowledge is vain save when there is work.

And all work is empty save when there is love;

And when you work with love you bind yourself to yourself, and to one another, and to God.

Questions on Reading Passage No. 2

1. What word in sentence two expresses 'the soul of the earth'?

2. What misconceptions (ideas) about work are put into our minds?

3. How can one learn the secret of life?

4. What prevents vain knowledge?

5. Which of the following is closest to the writer's meaning as expressed in the passage?

   (a) Life will become more tolerable if we work with each other in unison.

   (b) Work, like music, gives pleasure.

   (c) Work, with or without love, is to develop.

   (d) Work is essential to the understanding and fulfilment of life.

Answer Sheet to Reading Passage No.2

1. . . .

2. . . .

THE READING PASSAGE NO. 3

We all sat silent as if Selma had brought into the room with her a heavenly spirit worthy of mute respect. As she felt the silence she smiled at me and said, "Many a time my father has repeated to me the stories of his youth and of the old days he and your father spent together. If your father spoke to you in the same way, then this meeting is not the first one between us."

The old man was delighted to hear his daughter talking in such a manner and said, "Selma is very sentimental. She sees everything through the eyes of the spirit." Then he resumed his conversation with care and tact as if he had found in me a magic charm which took him on the wings of memory to the days of the past.

As I considered him, dreaming of my own later years, he looked upon me, as a lofty old tree that has withstood storms and sunshine throws its shadow upon a small sapling which shakes before the breeze of dawn.

But Selma was silent. Occasionally, she looked first at me and then at her father as if reading the first and last chapters of life's drama. The day passed fast in that garden, and I could see through the window the ghostly yellow kiss of sunset on the mountains of Lebanon. Farris Effandi continued to recount his experiences and I listened entranced and responded with such enthusiasm that his sorrow was changed to happiness.

Selma sat by the window, looking on with sorrowful eyes and not speaking, as though beauty has its own heavenly language, loftier than the voices of tongues and lips. It is a timeless language, common to all humanity, a calm lake that attracts the singing rivulets to its depth and makes them silent.

Questions on Reading Passage No. 3

1. What was the effect of Salma's entrance into the room on her father and the writer?

2. Did Salma think that she might meet the writer because: (a) She loved him at first sight; (b) He lived near where they lived; (c) She thought he loved her; (d) She thought they were similar in their outlooks as the result of the ideas put into their heads by their fathers?

3. What did the writer remind the old man of?

4. Who was like a lofty old tree?

5. What time of the day is the writer describing?

Answer Sheet to Reading Passage No. 3

1. . . .

2.

3. . . . . . .

4. . . . . . .

or

. . . .

5. . . .

Answers to questions on Reading Passage No. 1

1. When you give of yourself. (Giving of yourself)

2. None. (Useless)

3. Desire for recognition (hidden desire). (Giving for purpose)

4. Those who - (have little and) - give all.

5. Giving freely, spontaneous giving. (Unselfish) (without motivation)

Answers to questions on Reading Passage No. 2

1. Infinite.

2. Work is a curse and a misfortune.

3. Loving life through work. (Loving life through labour)

4. Work with love. (Work and love)

5. d) Work is essential to the understanding and fulfilment of life.

Answers to questions on Reading Passage No. 3

1. Silence. (Calming)

2. d) She thought they were similar in their outlooks as the result of the ideas put into their heads by their fathers.

3. His youth. (His past) (Past days)

4. Salma's father. (The old man) (Farris Effandi)

5. Sunset. (Evening)

SOCIAL STUDIES

THE READING PASSAGE No. 1

Agriculture, Mining, Fishing and Forestry belong to a class known as "Extractive Occupations", and a little consideration of what we have said will make it obvious that an extractive occupation is one in which man obtains either what Nature has provided absolutely, as in the case of the gold or the blackberries; or what Nature has provided with more or less of man's assistance, as in the case of crops such as wheat or fruits. In the case of Mining, the reader will realize that once the stock of gold, coal, iron, etc., is exhausted, nothing that man can do will make further mining possible there. On the other hand, man can do much in the other cases to prevent the exhaustion of, and even to add to supplies. He can add nourishment to the soil by using fertilizers and by refraining from growing the same crop in the same soil year after year; he can plant trees and leave Nature to rear them; and he can see that trees are not cut down wantonly; he can refrain from fishing in seas which are showing signs of exhaustion and so give time for the stock to replenish itself; or he can even introduce fish brought from other waters to increase the stock.

Raw materials provided by extractive workers are of little use, however, if they remain in the spot where they are produced: they must be taken to those who can change the form of the materials to make the things that people require. Tobacco is grown in Virginia, as we have mentioned, but it must be changed into cigarette form before such people as our friend Brown can have their wants satisfied. The majestic oak-tree may cause admiration when seen growing, but to see the tree growing will not be enough for the person who wishes to buy an oak table or oak chairs.

Questions on Reading Passage No. 1

1. What materials is this passage dealing with?

2. What do you call the act of planting trees and leaving them to grow?

3. What use has an exhausted mine?

4. What would happen if men were not careful in cutting down trees from a forest?

5. Would a soil, on which a particular crop is being planted for many years in succession, gain nourishment, increase its product, become completely useless, or lose fertility?

Answer Sheet to Reading Passage No. 1

1. . . .

2. . . .

3. . . .

4. . . . .

5.

THE READING PASSAGE No. 2

Our examination of the commercial group of occupations has given us the clue to the meaning we must give to the word "Commerce". The aim of all those engaged in Commerce is to distribute the whole of the raw and manufactured foodstuffs and products of the world so as to satisfy all our wants. The people of the British Isles require the fruits and rubber which can only be obtained in tropical lands; the teas, the coffees and the rice of such countries as India and China and Brazil. In other words, we require things which we cannot produce for ourselves. Some of us prefer to have the laces of Venice rather than those of Nottingham; or the Italian motor-car rather than a British car. So we also bring into our country things which we ourselves can produce. To get all these things to the place in which they are required is the task of the commercial workers. Hence, Commerce includes not only the buying and the selling of the goods, whether at home or abroad, but also all other work which makes that buying and selling possible or easier and which enables what has been bought or sold to be moved to the required places. The mere buying and selling we may term "Trade", and when we speak of "Trade" therefore we must realize that it is merely a branch of "Commerce". Banking makes it possible to pay for goods purchased abroad almost as easily as for those bought at home, whilst Insurance removes the risks which always exist when things are sent by land or by water to their destination; and Transport makes it possible to get the goods moved from one place to another. Without any one of these - Trade, Banking, Insurance and Transport - Commerce would be either impossible altogether or ever so much more difficult; many of the wants of mankind would have to go unsatisfied.

Questions on Reading Passage No. 2

1. Does rubber need:a)a humid and hot, b)a humid and fairly hot, c) a dry and hot, or d) a Mediterranean climate?

2. What is Nottingham famous for?

3. Does Commerce deal with the act of buying and selling: a) at home, b) abroad, c) both, or d)locally?

4. What name would you give to the mere act of buying and selling?

5. Would you draw a diagram to show the meaning of Commerce and Trade?

Answer Sheet to Reading Passage No. 2

1.

2. . . .

3. . . .

4. . . .

5.

THE READING PASSAGE No. 3

In some localities business may be carried on entirely on a cash basis; the people are accustomed and prepared to pay for the goods they buy when they buy them. But in some areas, the customers expect to be given credit. Giving credit is equivalent to lending money and the retailer who has to give credit largely will find that he has less money to make further purchases than he would have if he received cash down for the goods he sells. Thus if the business is going to be largely or wholly a credit one, the buyer will require all the more capital to make it a success.

The buyer, again, will always consider whether the premises offered to him are suitable both in form and in size; or whether they can be altered to suit his needs without too heavy expense if they are not suitable. Some buyers like to feel, moreover, that they have space for extending their premises sooner or later, and especialiy if their intention is to build up a departmental store.

Clearly, too, the buyer will wish to know what he will have to pay annually in the way of rent, rates, taxes and the like. And, as some shops are let on lease, that is for a number of years only, the buyer will take the precaution in such cases of finding out how many years of the lease have still to run. He will not desire to take over a shop this year from which he may be turned out next year owing to the fact that the term of years is up.

Questions on Reading Passage No. 3

1. Does the word 'buyer' in the second paragraph mean: (a) a cash customer; (b) a credit customer; (c) the customer of the retailer; or (d) a buyer of a business?

2. What does premises mean in this passage?

3. The writer is describing things which are important for a person to think of when about to set up as a ..... What?

4. A relatively big capital is important for a business run on a ..... What?

5. What does "to let a shop on lease" mean?

Answer Sheet to Selection No. 3

1.

2. . . .

3. . . .

4. . . . . . .

5. . . . . .

Answers to the questions on Reading Passage No. 1

1. Raw (natural).

2. Forestry. (Afforestation) (Reafforestation)

3. None.

4. The forest would be exhausted. (Depleted) (No forest would be left)

5. (d) Lose fertility.

Answer Sheet on Reading Passage No. 2

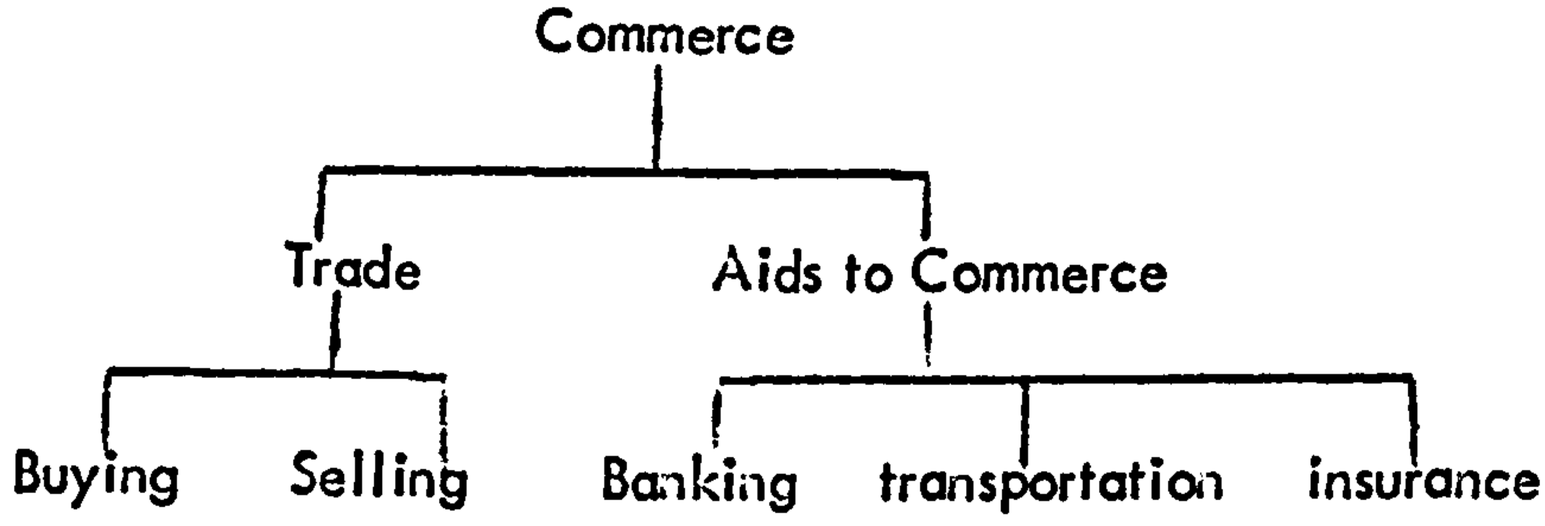
1. (a) A humid and hot.

2. Lace.

3. Both.

4. Trade.

5.



Answers to questions on Reading Passage No. 3

1. (d) A buyer of a business.

2. Shop.

3. Retailer.

4. Credit basis (System).

5. To let it for a limited number of years only.

APPENDIX 4

The Arabic Version of the Tests

(Answer Sheet and Answers to the Questions are the same as the English version)

Instructions were recorded.

الاســـــــــم :-

الكليـــــــــة :-

الاختصـــــــاص :-

" اختبار ســـــــــرعة القـــراءة "

١) استقبل اليوم الرئيس جمال عبد الناصـــر يوكوف مالك نائب وزير خارجيـــــة الاتحاد السوفيتي • (القاهرة بالعربي) •

٢) لقد وافق مجلس الوزراء السوداني على اقصاء الطيارين الاجانب العاملـين في ميناء بورت سودان •

٣) لقد علم انه تقرر اشتراك ليبيا في اجتماعات لجنة الاعلام العربية الدائمـــة •

٤) ان العقـود لتأسيس معمل سماد كيمياوى في البصرة قد وقعت من قبـــل وزير الصناعة والكلفة العامة لهذا المشروع هو ٨٠٥٠٠٠ر٠٠٠ دينارا •

٥) لقد صادق مجلس الوزراء على مرسوم يقضي بفرض الاحكام العرفية في جميـــع انحاء البلاد لمدة اقصاها ثلاثة شهور اخر ابتداء من تاريخ مصادقةمجلس الامة على القانون • (الكويت بالعربي) •

٦) اعلنت اذاعة القاهرة التي كانت قد اذاعت البيان الرسمي بشأن ابتهاءاجتماع الزعماء العرب في القاهرة في الساعة الثامنة من يوم ١٦ تموز ، اعلنت في يوم ١٧ تموز عن مغادرة الرئيس عارف وبومدين الى موسكو •

٧) لقد ابرق احد مراسلينا الحربيين صباح اليوم من القاهرة كي يزودنا ببعـــض التفاصيل بخصوص المعارك التي وقعت على قناة السويس في يومي الجمعـــــة والسبت فقال ان مشاركة القوات المسلحة الجزائرية مع العرب في القتال كـان فعالا ومباشرا •

٨) اذاعت محطة جدة في الساعة ١٢و٤٢ دقيقة حسب توقيت كرنتش من يوم ١٦ تموز البيان التالي : " نشرت صحيفة البلاد تصريحا للسيد احمد زكي يماني وزير النفط والثروه المعدنية بشأن موقف المملكة العربية السعودية مـــن مسألة استئناف شحن النفط الى الولايات المتحدة وبريطانيا • وقال الوزيـــر في تصريحه ان المملكة العربية السعودية لم تقـرر بعد استئناف ضـــــخ النفط الى البلدين المذكورين •

اسئلة لغرض فحص سرعة القراءة

١ــ انباء موجزة عن رود سيا • ( )
٢ــ اجتماع الزعماء العرب في القاهرة • ( )
٣ــ انباء موجزة عن زامبيا • ( )
٤ــ بواخر روسية تزور الجمهورية العربية المتحدة • ( )
٥ــ مقابلة مالك وناصـــــر • ( )
٦ــ تنازل زعيم تنزانيا عن مصالحة التجارية • ( )
٧ــ فصل اربعة جنود من الجيش النايجيرى • ( )
٨ــ رفع الحظر المغربي عن الصحف • ( )
٩ــ اشتراك ليبيا في لجنة الاعلام العربية • ( )
١٠ــالاحكام العرفية في الكويت • ( )
١١ــاذاعة جدة وانقسام العرب • ( )
١٢ــاذاعة القاهرة بخصوص الاصطولين الامريكي والسوفيتي في البحر الابيض المتوسط • ( )
١٣ــاذاعة القاهرة حول الوضع في الجنوب العربي • ( )
١٤ــالجزائر في قتال منطقة قناة السويس • ( )
١٥ــرسالة بودغورني الى عارف • ( )
١٦ــالقتال في منطقة قناة السويس • ( )
١٧ــفصل اربعة طيارين اجانب في بورت سودان • ( )
١٨ــعقد مع اليابان لانشاء مصنع للاسمدة الكيماوية • ( )
١٩ــاجتماع وزراء الخارجية في زامبيا • ( )
٢٠ــالشرق الاوسط • ( )
٢١ــعودة اللاجئين الى الضفة الغربية • ( )
٢٢ــنداء اسيوي الى سكان الاقليم الجنوبي الشرقي • ( )
٢٣ــالتجنيد في المغرب • ( )
٢٤ــموقف المملكة العربية السعودية من صادرات النفط • ( )

القطعة الاولى

كانت الساعة السابعة ولم تكن هي في ذلك الوقت جد بعيدة عن "رافيلو" غير ان جهلها بالمكان ولرقه افقدها القدرة على معرفة مدى قربها من نهاية رحلتها وشعرت عندها بحاجة الى الراحة ولم تكن تعرف من الراحة الا نوعا واحدا ـ هو المخدر . واخرجت "موللي" قنينة غامقة ثم تمهلت قبل ان ترفعها الى فمها ولكن لم تمض لحظة واحدة الا وكانت ترمي شيئا ما ـ ولم يكن ذلك الشيء الا القنينة الفارغة ... ثم استانفت السير رغم تلك الرياح الباردة التي اعقبت تساقط الثلج . واخذ مفعول الدواء يسرى في جسمها ببطء يساعده في ذلك البرد والتعب ، ولم يمض طويل من الوقت حتى شعرت بحاجة ملحة الى النوم وهي هائمة على وجهها في الطرقات .

انكشفت السماء ولمعت النجوم واطلت هالة من النور الفضي على بياض الثلج ولكن عينا المرأة اظلمتا ولم تقويا على الرؤية ووهنت ساقاها فلم تستطيعا حمل جسمها المتخدر فخرت على الارض تحت شجرة صارت متكأ لراسها واضطجعت على الفراش الثلجي الناعم لا تشعر ببرودته ولا تحسب اى حساب لاستيقاظ وبكاء طفلتها التي نامت بين ذراعيها وكانها نائمة في فراشها الصغير .

وما ان نامت "موللي" نوما عميقا حتى انفلتت اصابعها وارتخت ذراعاها وسقط الراس الصغير وانفتحت العينان الزرقاوان على النجم الباردة .

اسئلة على قطعة القراءة

رقم (١)

١ــ ما الذى ادمنت عليه موللي ؟

٢ــ ماذا شربت موللي ؟

٣ــ في اى فصل من فصول السنة وقعت حوادث هذه القطعة ؟

٤ــ في اي ساعة من ساعات اليوم وقعت حوادث القطعة ؟

٥ــ ما نوع النوم الذى تملك موللي ؟

القطعة الثانية

عندما عاد "مارنر" الى رشده اكمل عملية غلق الباب التي كان قد بداءهـــا ولم يستطع انجازها بسبب النوبة التي انتابته ، ولم يكن يعلم كم استغرقت نوبته غـــير انه لاحظ ان النار قربت من الخمود وانه يشعر ببرد ووهن فتقدم في الغرفة نحوالنار الضعيفة في الموقد وجلس على كرسيه بجانب الموقد ، وبينما كان منحنيا يغذى النـــار ببعض الحطب تراءى لبصره الضعيف ذهب مكوم على ارض الكوخ ، ذهب ؟ هو ذهبه ! وقد عاد اليه بنفس الطريقة الخامضة التي اختفى فيها . مرت دقائق قبل ان يجد "مارنر" القدرة على مد يده ولمس الكنز ، واخذت كومة الذهب ذات اللمعان تكبر وتكبر فـــي عيني "مارنر" المتسعتين استغرابا ، واخيرا انكب الى الامام ومد يده فلمست اصابعـــه خصلات شعر ناعمة دافئة بدلا من قطع نقود صلبة .

ثم سقط "مارنر" على ركبتيه وانكب برأسه متفحصا ذلك الشيء العجيب الذي لـــم يكن الا طفلة نائمة تكلل رأسها خصلات من الشعر الذهبي الناعم . أيمكن ان تكـــون تلك الطفلة اخته وقد تراءت له في الحلم ؟ ايمكن ان تكون اخته التي اعتاد ان يحملها بين ذراعيه من مكان الى آخر قبل ان تموت بسنة وهو طفل حافي القدمين ؟ تلك كانت اول خاطرة خطرت "لمارنر" ذي الفكر المشوش ، اذ ان الطفلة كانت كثيرة الشبـــه باخته الصغيرة ، ثم "غاص "مارنر" في كرسيه بلا حول ولا قوة ، اذ امتلكه العجـــب والحيرة واخذت تتقاذفه الذكريات الماضية . كيف ومتى دخلت الطفلة الصغيرة الى الكوخ بدون علمه وهو لم يتعد عتبة بابه ؟ .

اسئلة على قطعة القراءة

رقم (٢)

١ــ اى عملية توقفت ولم تنجز بسبب غيبوبة مارنر ؟

٢ــ كم استغرقت نوبة مارنر ؟

٣ــ اين كان مارنر واقفا عند مالاحظ خفوت النار وشعوره بالبرد والضعف ؟

٤ــ هل وجد مارنر ذهبا ام تصور انه وجد ذهبا على ارض كوخه ؟

٥ــ بمن ذكرته الطفلة ؟

القطعة الثالثة

كانت السيدات في تلك اللحظة قد اقترن شوقا لمعرفة الاسباب التي دفعت بالحائك الى الحضور في تلك الظروف العجيبة .

وتسألت عدة سيدات مرة واحدة : "اية طفلة هذه ؟ "فاجاب "كودفرى" وهو يبذل جهدا عظيما : "لا اعلم" ثم استرسل قائلا : "امرأة فقيرة وجدت في الثلج على ما اعتقد ، وهذه طفلتها" فوجهت السيدة "كمبل" الحديث الى "مارنر" قائلة: "يجب ان تترك الطفلة هنا ايها السيد "مارنر")) .

فاجاب "مارنر" على عجل : ((كلا ــ كلا ــ انا لا استطيع التخلي والابتعاد عنها وقد جاءت الي" فمن حقي الاحتفاظ بها .)) .

ذهل "مارنر" لفكرة اخذ الطفلة منه اذ لم تخطر له على بال .كما انه استغرب من رده بالرفض اذ لم تكن له اى فكرة واضحة عما هو فاعل بالطفلة قبل فترة وجيزة ؟

وقالت السيدة "كمبل" لجارتها بلطف واستغراب ((هل سبق لك ان سمعت مثل هذا الشيء ؟)) . وقال الطبيب ""كامبل" مخاطبا السيدات وهو غاضب لاستدعائه وحرمانه من التمتع بامسية شيقة : ((والان ايتها السيدات اسمحن لي ان اطلب اليكن التنحي جانبا)) . وخاطب رب البيت الطبيب قائلا : ((ليس من المبهج ان تخرج بمثل هذا الطقس ، اليس كذلك ياكمبل ؟)) فاجاب الطبيب ((نعم هذا صحيح)) ثم وجه كلامه الى ""كودفرى" قائلا: "احضر لي زوجا من الاحذية الذي يلبس في مثل هذا الجو وارسل من يخبر "دوللي ونثروب" لتذهب الى كوخ "مارنر" اذ انها خير من يليق لمثل هذه المناسبات .

وبدأت الطفلة تبكي وتنادى امها اذ لم تعد تأبه بالانوار البراقة ووجوه السيدات الباسمة بل ازدادت تعلقا باثواب "مارنر" وعندما عاد "كودفرى" بالحذاء سمع صراخ الطفلة وشعر كأن شيئا ما ينتزع من قلبه فقال بسرعة وهو متشوق للقيام بحركة ما ، ((سأذهب بنفسي الى السيدة "دوللي" لأجلبها معي .. اما الطبيب فقد ذهب بصحبة "مارنر" والطفلة الى الكوخ .

اسئلة على قطعة القراءة

رقم (٣)

١ــ هل اقتربت السيدات لرقة قلوبهن ام لنشاطهن ام لمشاكستهن ام لحـــب استطلاعهن ؟

٢ــ كيف تلقت السيدة كمبل خبر رفض مارنر بالتخلي عن الطفلة ؟

٣ــ من تحتم عليه الخروج في تلك الليلة ؟

٤ــ كيف كان البـــــو ؟

٥ــ هل تظن ان شعور كودفرى " بانتزاع شيء من قلبه عند سماعه صراخ الطفلة يعود الى رقة قلبه ام الى علاقته بالطفلة ام الى امسية متعبة ؟

المقطع المعد للقراءة رقم (١)

"الدايا مغناطيسية" عبارة عن المغناطيسية الناتجة عن الحث وهي ،عكس المجال المولد للحث ،يظهر على مواد غير مغناطيسية عند وضعها في مجال مغناطيسي . ان ذرة مادة دايا مغناطيسية تفتقر الى عزم مغناطيسي ثابت في غياب المجال المغناطيسي ، لذلك مايظهر ان العزوم المغناطيسية للمدارات المشغولة تمحى كل منها الاخر وبذا يكون دوران الالكترون زوجي (كل زوج يتكون من دورتين) يعاكس كل منهما الاخر بالاتجاه) . فلذا يجب ان يكون هناك عدد زوجي من الالكترونات في كل ذرة او ايون ، او جزيئة تتكون منها المادة الدايا مغناطيسية . هذا وعند تسليط مجال مغناطيسي خارجي تزداد سرعة المدارات المشغولة او تبطئ طبقا لاتجاه الدوران وهذا مايسبب محصلة العزم المغناطيسي في الذرة . وخلال الفترة القصيرة من الوقت بين حالة تسليط المجال المغناطيسي وحالة وصوله الى حده الاعلى يتغير المجال وهكذا يحث قوة محركة كهربائية (EMF) في الذرة .ان التيار الذى ينساب في الذرة نتيجة الحث الكهرمغناطيسي يجب ان يحمل بواسطة الالكترونات . لان $i = (W/2\pi)$ لذا فان كل تغير بـ i يسبب تغيير في W وبالاخير تغيير في العزم المغناطيسي .

استنادا الى قانون لينز ، يعاكس المجال المغناطيسي المتولد بالحث المجال المغناطيسي الخارجي . ولانه لا توجد مقاومة كهربائية في الذرة فالتيار الاضافي يستمر على الانسياب ، والمغناطيسية الناتجة عن الحث تبقى طالما بقي المجال الخارجي مسلطا . وعند انقطاع المجال ، تفقد الذرة مغناطيسيتها كنتيجة عكسية لعملية تسليط المجال الخارجي . كل الذرات تظهر الدايا مغناطيسية سواء كانت تحتوى على الكترونات زوجية او غير زوجية ولكن بالنسبة لتلك التي تمتاز بمغناطيسية دائمة يختفي فيها التأثير الدايا مغناطيسي .

اسئلة عن المقطع رقم (١)

١ــ على اى شيء تحصل عند وضع موادغير مغناطيسية في مجال مغناطيسي ؟

٢ــ ماذا يحدث للعزوم المغناطيسية للمدارات المشغولة في ذرة مادة دايا مغناطيسية عند قطع المجال المغناطيسي الخارجي ؟

٣ــ ماهي الحاملات لتيارات الحث في الذرة ؟

٤ــ ماذا تغير في هذه المعادلة $\bar{i} = \frac{1}{2\pi}(W)$ لكي يتغير العزم المغناطيسي ؟

٥ــ في اى نوع من الذرات يختفي التأثير الدايا مغناطيسي ؟

المقطع المعد للقراءة رقم (٢)

يتعلق البحث التالي بالذرات المتصفة بال IS المتقارن ٠

في مجال مغناطيسي شديد يقع المحور المغناطيسي للذرات ، سواء كان بارا مغناطيسي او دايا مغناطيسي ، تدر الامكان على امتداد اتجاه المجال ٠ وهكذا تكون المحصلة المغناطيسية لعزم كافة الذرات في الحد الاعلى ٠ وبوجود مجال مغناطيسي ضعيف ، تمارس كل ذرة ازدواجا يوجهها وجهة اتجاه المجال ولكن هذه القوة ليست كافية لجلب المحاور المغناطيسية لكل الذرات في خط المجال ٠ وهذه الحالة تهم السبكتروسكوبست لان تأثير زيمان ، اى انقسام كل خط مفرد الى عدة خطوط ، ممكن ملاحظته في مجال مغناطيسي ضعيف ٠

وفي مثل هذه الظروف يصبح من الممكن تعيين الكمية J من قيمة عدد الطاقة (M) التي تعتبر نظيرا لعدد الطاقة (m) التي تحدد تصرفات كل ذرة في مجال مغناطيسي خارجي ٠

يأخذ (M) كل القيم الواقعة بين (J+ الى J-) ٠ فبالنسبة لقيمة معينة من (M) ، يعمل اتجاه (J) زاوية ثابتة مع اتجاه المجال الخارجي ويكاد يسبق (J) اتجاه هذا المجال ٠ هذا بينما في حالة عدم وجود مجال خارجي يظهر خط مفرد في السبكترم (الطيف) يمثل الانتقال الى الحالة المتمثلة بالقيمة المحدودة من (J) وبوجود المجال الخارجي ينقسم هذا الخط الى عدة خطوط تمثل مستويات طاقة مختلفة مرتبطة بتغير قيم (M) ٠

ان عدد الخطوط التي تنقسم من الخط الاساسي تتبع القوانين الاختيارية للانتقال ٠ القانون هو (J) (وبالاخير " M " ايضا) يمكن ان يتغير بـ صفر و $\pm$ ١ والتحول صفر ← صفر ممنوع ٠

اسئلة عن المقطع رقم (٢)

١ــ اذا اردت ان تشاهد تأثير " زيمان " اى نوع من المجال المغناطيسي تختار ؟

٢ــ اى من المجالات المغناطيسية التالية اهم للسپكتروسكوپست :

ا) المجال الذى يجلب المحاور المغناطيسية لكل الذرات الى خط في المجال .

ب) المجال الذى يبعثر المحاور المغناطيسية لكل الذرات حول خط في المجال .

ج) المجال الذى بوجوده تمارس الذرة ازدواجا يوجه وجهتها طبقا لاتجاه المجال .

د) المجال الذى يقود المحاور المغناطيسية لكل الذرات للاتجاه المعاكس للمجال .

٣ــ مالاسم الذى تقرنه بانقسام الخط المفرد الى عدد من الخطوط ؟

٤ــ اى من الاشياء التالية تتحكم بتصرفات ذرة مفردة في تيار مغناطيسي خارجي :

ا) القيمة (J) .

ب) عدد الطاقة (M) .

ج) عدد الطاقة (m) .

د) اما M او m

٥ــ ماذا يدعى القانون التالي ؟

(J) (وبالاخير M ايضا) يمكن ان يتغير بـ صفر و $\pm$ ١ والتحول صفر ــــــ صفر ممنوع .

المقطع المعد للقراءة رقم (٣)

السيميكوندكترات (شبه موصلات) • وهذه مواد ذات تراكيب بلورية تعمل كعازلات تحت ظروف اعتيادية ولكن يمكن جعلها موصلات برفع درجة حرارتها او باضافة الشوائب • يمكن تصنيف هذه المواد الى صنفين : أ ـ الشبه موصلات الحقيقية • ب ـ الشبه موصلات p و n •

الشبه موصلات الحقيقية تتميز بمنحنيات (E) N من النوع الموضح بشكل رقم ١١ (ب) و ٦ • ان المناطق البرليونية لا تدخل مع بعضها ولكنها على تماس وتجاور ولا توجد مناطق مملوءة جزئيا • فكمية صغيرة من الطاقة كتلك المكتسبة لغرض الاثارة الخارجية تعتبر كافية لرفع الكترونات من مستويات طاقة عالية من المنطقة المملوءة الى مستويات طاقة واطئة في المنطقة المجاورة والتي كانت الى الان خالية • وبهذا تتكون منطقتين مملوءتين جزئيا ، فعندما يسلط مجال كهربائي خارجي تتحرا قسم من الالكترونات التي المستويات غير المملوءة بالطاقة • والكرافيت مثال معروف للشبه موصلات الحقيقية ولكن لا يوجد عدد كبير من هذه المواد التي تكون الطبقات البرليونية فيها متماسة بالضبط وعديمة التداخل •

الشبه موصلات p و n : توجد مواد غير موصلة في حالتها النقية ولكنها تصبح موصلة باضافة الشوائب اليها ان منحنياتها الـ (E) N تظهر فيها فجوات طاقة صغيرة تحتوى على مستويات طاقة عائدة الى الشوائب •

اسئلة عن الاختيار رقم (٣)

١ــ الى اى شيء تحول السيميكوندكتر بالتسخين ؟

٢ــ المناطق البرليونية للمادة السميكوندكترية عادة مناطق مملوءة . ماذا تعمل لكي تحصل على منطقتين مملوءتين جزئيا ؟

٣ــ الى اى مكان تتحرك الكترونات منطقة شبه مملوءة عند تسليط مجال كهربائي خارجي ؟

٤ــ في اى مادة تكون المناطق البرليونية متجاورة وغير متداخلة ؟ سميها ؟

٥ــ في اى حالة تصبح الشبه موصلات n و p موصلات ؟

القطعة الاولى

فقال المصطفى : انك لتحـ اي القليل عندما تعطي مما تملك فاذا اعطيـت من ذاتك ، اعطيت حقا • وهل ما تملك الا شيئا ترعاه وتحرص عليه، خشيـة ان تضطرك الحاجة اليه في غدك ؟ • وغد ، ماذا يحمل الغد لكلب شديد الحرص يخفي العظام في باطن الرمال المهجورة ، وهو يتبع الحجيج الى المدينةالمقدسة ؟ • ثم •• أليس خوف الحاجة ، هو الحاجة نفسها ؟ • أليس خوف الظمأ ، والنبـع فياض ، هو المطر لا تروى له غلة ؟

ومن الناس من يعطي القليل ••• وعنده الكثير ! اولئك يعطون تباهيا بالعطاء ، فتدنس طوايا نفوسهم طهارة عطاياهم • ومنهم من لا يملك الا القليل فيجـود به كله • اولئك هم المؤمنون بالحياة وما فيها من خير ، فلا تفرغ خزائنهم ابدا • ومنهم من يعطي راضيا مغتبطا ••• وحسبه هذا الجزاء •ومنهم من يعطي متألما ••• وفي هذا الالم تطهير لنفسه • ومنهم من يعطي ولا يحس الما ، ولا يلتمـس رضى ، ولا يفكر في ان عطاءه فضيلة • اولئك يعطون ، فيكون عطاؤهم كالريحـان ينفث عطره في الفضاء • وتتجلى في فيض ايديهم كلمة الله ، ومن خلال عيونهـم تشرق بسماته على الارض •

اسئلة على القطعة الاولى

١ــ ما المعنى الحقيقي للعطاء ؟

٢ــ مافائدة الانسان من رعاية مايملك من اشياء حسب الرأي الوارد في القطعة ؟

٣ــ ماذا يدنس طهارة العطاء ؟

٤ــ من هم المؤمنون بالحياة ؟

٥ــ اى نوع من العطاء شبه بالريحان ؟

القطعة الثانية

((العمل)) . قال المصطفى : انت تعمل كي تلاحق الارض وتدرك سرها . فاذا توانيت اصبحت غريبا عن مواقيتها ، خارجا عن موكب الحياة ، وهـــو يمضي في جلال ، وتسليم شامخ ... للخلود .

وحين تعمل فانت مزمار ، تتحول من خلاله همسات الزمن الى انغام . ومـن منكم يريد ان يصبح قصبة خرساء صماء ، بينما يغني الجميع من حولها فـــي انسجام ؟ .

وما اكثر ما سمعتم ان العمل لعنة بلما نقمة تلحق بالعاملين . وعندي انكم حين تعملون ، تشاركون في تحقيق جزء من حلم الارض البعيد بنصيب تدرعليكـم يوم ان ولد هذا الحلم . وحين تمضون في العمل ، تمارسون في الحق حب الحياة . وحب الحياة بالعمل ، يصلكم باذق اسرار الحياة . اما اذا صورت لكم الالمكـــم ان مولدكم ... مأساة ، وتلبية مطالب الجسد لعنة كتبت على الجبين . فاني اقول لكم : هيهات ان يمحو ماسطرعلى الجبين الا حبات العرق .

ولقد نبئتم ايضا ان الحياة ظلام ، حتى اصبحتم تردون من فرط التعـب مايقوله المكدود . ولعمري ان الحياة ظلام الا اذا صاحبها الحافز . وكل حافـز ضرير الا اذا اقترن بالمعرفة . وكل معرفة عمياء ، الا اذا رافقها العمل . وكل عمـل فارغ ، الا اذا امتزج بالحب . فاذا امتزج عملك بالحب وصلت نفسك بنفســـك وبالناس ، وبالله .

اسئلة على القطعة الثانية

١ــ اي كلمة في الجملة الثانية من القطعة تعطي المعنى الاتي "سر الارض" ؟ .

٢ــ ماهي الافكار الخاطئة التي تلقناها عن العمل ؟

٣ــ كيف يستطيع الانسان معرفة سر الحياة ؟ .

٤ــ ماذا يمنع المعرفة من ان تكون هباء ؟ .

٥ــ اى من الجمل الاتية اقرب الى المعنى الذى عبر عنه جبران في القطعة التي قرأتها ؟ :

أ ــ تصبح الحياة اكثر احتمالا اذا عمل الناس معا بانسجام .

ب ــ العمل ــ مع الحب او بدونه ــ يعني التقدم .

جـ ــ العمل يطرب كالموسيقى .

د ــ العمل شيء اساسي في معرفة الحياة وتحقيقها .

القطعة الثالثة

جلسنا جميعا ساكتين كأن سلمى قد ادخلت معها الى تلك الغرفة روحا علوية توعز الصمت والتهيب ، وكأنها شعرت بذلك فالتفتت نحوى وقالت مبتسمة ((كثيراحدثني والدى عن ابيك معيدا على مسمعي حكايات شبهابهما ، فأن كان والداك قد اسمعك بتلك الوقائع لا يكون هذا اللقاء هو الاول بيننا)) .

فسرّ الشيخ بكلمات ابنته وانبسطت ملامحه ثم قال ((ان سلمى روحية الاميال والمذاهب فهي ترى جميع الاشياء سابحة في علم النفس)) .

وهكذا عاد فارس كرامه الى محادثتي باهتمام كلي ورقة متناهية كأنه وجد فيّ سرا سحريا يرجعه على اجنحة الذكرى الى ربيع ايامه الخابرة .

كان ذلك الشيخ يحدق بي مسترجعا اشباح شبابه وانا اتأمله حالما بمستقبلي . كان ينظر اليّ مثلما تخيم اغصان الشجرة العالية المملوءة بماتي الفصول فوق غرسة صغيرة مفعمة بعزم هاجع وحياة عمياء . شجرة مسنة راسخة الاعراق قد اختبرت صيف العمر وشتاءه ووقفت امام عواصف الدهر وانوائه . وغرسة ضعيفة لينة لم تر غير الربيع ولم ترتعش الا بمرور نسيم الفجر .

اما سلمى فكانت ساكنة تنظر اليّ تارة وطورا الى ابيها كأنها تقرأ في وجهينا اول فصل من رواية الحياة واخر فصل منها .

قضى ذلك النهار متنهدا انفاسه بين تلك الحدائق والبساتين وغابت الشمس تاركة خيال قبلة صفراء على قمم لبنان المتعالية قبالة ذلك المنزل وفارس كرامه يتلو علي اخباره فيذهلني وانا اترنم امامه باغاني شبيبتي فاطربه ، وسلمى جالسة بقرب تلك النافذة تنظر الينا بعينيها الحزينتين ولا تتحرك وتسمع احاديثنا ولا تتكلم كأنها عرفت ان للجمال لغة سماوية تترفع عن الاصوات والمقاطع التي تحدثها الشفاه والالسنة لغة خالدة تضم اليها جميع انغام البشر وتجعلها شعورا صامتا مثلما تجتذب البحيرة الهادئة اغاني السواقي الى اعماقها وتجعلها سكرتا ابديا .

اسئلة على القطعة الثالثة

١ــ ماذا كان تاثير دخول سلمى الغرفة على اباها والكاتب ؟

٢ــ هل اعتقدت سلمى ان هناك احتمال ان تقابل الكاتب لانها ا) احبته من اول نظرة ب) تصورت انه احبها ؟ ج) اعتقدت انهم متشابهون فينظرتهم الى الحياة نتيجة للأفكار التي توارثوها من اباءهم د) ام لانه كان يسكن بالقرب من مكان سكناهم ؟ .

٣ــ بماذا ذكر الكاتب الشيخ ؟

٤ــ من كان يشبه شجرة مسنة راسخة الاعراق ؟

٥ــ اى وقت من النهار يصف الكاتب في هذه القطعة ؟

قطعة القراءة الاولى

الزراعة ، التعدين ، صيد الاسماك ، واستثمار الغابات حرف تنتمي الى صنف من اصناف العمل المعروفة بـ (المهنه الاستخراجية) وبعد تمحيص قليل لما قلنا نجد ان معنى هذه الحرف واضح جلي وهو يعني اى حرفة يقوم بها الانسان ويحصل فيها على مواد طبيعية بحته كما هي الحالة في الحصول على الذهب ، او يحصل فيها على مواردطبيعية نتيجة لقيامه ببعض الاتعاب لمساعدة الطبيعة ، كما هي الحالة في الحصول على المنتوجات الزراعية كالحبوب والفواكه . اما في حالة التعدين فلا بد وان القارئ سيلاحظ ان ليس هناك مايستطيع الانسان عمله كي يجعل التعدين ممكنا اذ نفد الاحتياطي من الذهب او الفحم او الحديد في مناجمها . اما في الحالات الاخرى فالانسان قادر على عمل الكثير لمنع نفاد الاحتياطي في المواد الاولية او حتى العمل في زيادة الانتاج . ان للانسان القدرة على اعادة الخصب الى الارض باستعمال بعض الاسمدة ، او التجنب عن زرع نفس النوع من النبات في نفس التربة سنة بعد اخرى . كما ان باستطاعته غرس الاشجار وتركها تنمو بالطبيعة ، ومراقبة قطع الاشجار ومنع قطعها بالصورة الغير ، والامتناع عن صيد الاسماك في المياه التي تقل فيها كي يعطيها فرصة لاعادة احتياطيها ، او تزويد تلك المياه باسماك تجلب من مياه اخرى .

ان المواد الاولية المجهزة من قبل (العامل الاستخراجي) تكون قليلة الفائدة اذا تركت في اماكنها . وعلى هذا يجب ان تؤخذ المواد الخام الى اولئك الذين يغيرون شكلها بحيث تلائم حاجة الناس . ينمو التبغ في فرجينيا كما قلنا ولكن ليس باستطاعة الناس ـــ كرميلنا " براون " ـــ ان يستفيدوا او يحصلوا على حاجتهم منها الا اذا حول التبغ الى سيكاير .

اسئلة على قطعة القراءة الاولى

١ــ ماهي نوع الموالح التي تحتلها هذه القطعـــــــة ؟

٢ــ بماذا تسمى عملية غرس الاشجار وتركها تنمو بالطبيعة ؟

٣ــ مافائدة المنجم اذ نفد ؟

٤ــ ماذا يحدث للغابة اذا لم يكن الإنسان حذرا في قطعـــه للاشـــجار ؟

٥ــ هل الارض التي يزرع فيها نوع واحد من النبات لسنين متعاقبة تزداد خصبا ام تزداد انتاجا ام تصبح عديمة الفائدة ام انها تفقد مـــــن خصبتها ؟

قطعة القراءة الثانية

ان فحصنا لجماعة المحترفين من التجار قد زودنا بدليل نتوصل به الى المعنى الذى نستطيع اعطاءه لكلمة " التجارة " . ان غاية الممتهنين للتجارة هي توزيع جميع المواد ، الخام منها والمصنوعة ، في العالم بصورة تشبع حاجاتنا . ان سكان الجزائر البريطانية تحتاج الى الفواكه والمطاط الذى هي من منتجات المناطق الاستوائية فقط ، كما انهم يحتاجون الشاى والقهوة والرز من بعض الاقطار كالهند والصين والبرازيل .

وبكلمة اخرى نحن نحتاج الى اشياء لاقدرة لنا على انتاجها . غير ان بعضنا مايفضل الحصول على الدانتيلا من "فينيسيا " على ان يحصلها من " نوتينغهام " او يفضل الحصول على سيارة ايطالية بدلا من سيارة انكليزية ، وهكذا نستورد اشياء نستطيع انتاجها بانفسنا . ان عملية ايصال هذه الاشياء الى الاماكن التي تحتاجها هي من اختصاص عمال التجارة . وهكذا فان التجارة لا تشمل البيع والشراء — كان داخليا ام خارجيا — فحسب بل تشمل جميع الاعمال الاخرى التي تروج عملية البيع والشراء وتسهلها وتساعد على نقل مابيع واشترى الى اماكنها . ويطلق اسم " تريد " على عملية البيع والشراء فقط ، ولهذا فعندما نتكلم عن الـ "تريد" يجب علينا ان ندرك انها فقط جزء من التجارة . جعلت البنوك عملية الدفع للبضاعة المشتراة في الخارج سهلة كعملية الدفع للبضاعة المشتراة في نفس القطر ، في حين ان التأمين يضمن سلامة وصول البضائع المرسلة بحرا او برا الى وجهاتها ، وان طرق المواصلات تسهل نقل البضائع من مكان الى آخر . والتجارة تكون متعذرة او صعبة للغاية دون ان ترتكز على العوامل التالية : عملية البيع والشراء ، البنوك ، التأمين ، وطرق المواصلات ولن تتحقق رغبات الناس الا بالالتزام بهذه العوامل .

اسئلة على قطعة القراءة الثانية

١ــ هل المطاط بحاجة الى مناخ رطب وحار ام رطب ودافئ ام حار وخال من الرطوبة ام هو بحاجة الى مناخ البحر الابيض المتوسط ؟

٢ــ بماذا تشتهر نوتينغهام ؟

٣ــ هل التجارة تتعامل بالبيع والشراء ، (أ) في داخل القطر ، (ب) في خارج القطر ، (جـ) في الداخل والخارج ، (د) ام تتعامل بالبيع والشراء المحلي ؟

٤ــ اى كلمة تطلق على عملية البيع والشراء فقط ؟

٥ــ المطلوب القيام برسم شكل تخطيطي يبين معنى التجارة وعملية البيع والشراء .

قطعة القراءة الثالثة

في بعض المناطق يعتمد الناس على الدفع بالنقد في عمليات بيعهم وشرائهم ، وقد اعتادوا استعد هؤلاء للدفع نقدا عن البضاعة التي يبتاعونها . ولكن في مناطق اخرى يتوقع الزبون ان يعطى اعتمادا والاعتماد يعني القرض المحدد حسبما تقتضيه المصلحة . فبائع المفرد الذى يتعامل بالاعتمادات بصورة واسعة سرعان مايجد نفسه بحاجة الى مزيد من المال لشراء مايرغب من بضائع بعكس البائع الذى يتعامل بالنقد . وهكذا اذا كانت عملية البيع والشراء معتمدة اعتمادا كليا او بصورة كبيرة على الاعتمادات (القروض) فالشرط الاساسي لنجاحها هو راس المال الكبير .

والمشترى يفكر اينما فيما اذا كان الحانوت المعروض عليه للبيع مناسبا في شكله وحجمه . اما في حالة عدم مناسبته وحاجته الى التغيير الذى يناسب للباته فان تفكير المشترى يتجه الى مقدار مايكلفه هذا التغيير ، ويحرص على ان لا يكلفه هذا التغيير مبلغا باهضا . وبالاضافة الى هذا فان بعض المشترين يرغبون ان يشعروا في ان هناك مجالا لتوسيع محلهم عاجلا كان ذلك ام آجلا وخصوصا اذا كانت غايتهم تأسيس حانوت ذى اجنحة واقسام .

ومن الواضح ان المشترى يرغب في معرفة ماعليه ان يدفعه سنويا للايجار وللضريبة ولضريبة العقار وما شابه . وبما ان بعض الحوانيت تؤجر بالايجار الطويل المدى وذلك لسنين معينة فقط ، فالمشترى يرغب في معرفة السنين الباقية لايجار الحانوت حذرا منه واحتياطا ، لانه لا يرغب ان يتسلم حانوتا ليتركه بعد سنة بسبب انتهاء الايجار .

اسئلة على قطعة القراءة الثالثة

١ــ هل كلمة مشتري في المقطع الثاني من قطعة القراءة الثالثة تعني : زبونا يتعامل بالنقد ام زبونا يتعامل بالقرض ام زبونالبائع المفرد ام مشتريا لمصلحة ؟

٢ــ مامعنى كلمة "حانوت" في القطعة هذه ؟

٣ــ يصف كاتب القطعة اشياء مهمة يجب التفكير بها من قبل المشرف على تأسيس مصلحة . ماهي هذه المصلحة ؟

٤ــ راس المال الكبير مهم نسبيا لمصلحة تقوم على ماذا ؟

٥ــ مامعنى مايلي : "ايجار حانوت بالايجار الطويل" ؟

NOTE

Arabic answer sheets need not be repeated here since they are exactly the same as those of the English. The reader may refer to Appendices II and III for format of the answer sheets.

APPENDIX V

Fourth-Year Component Analysis

1. Sciences
2. Arts
3. Social Studies

Fourth-Year Groups (Science, Arts and Social Studies)

Factor Analysis by the Method of Principal Component

The procedure used to analyse the components obtained from the results of the fourth-year students is the same as that carried out with first-year students. In both groups ten components were extracted. The loadings of the variables, their communalities and the percentage of the variance for each component and the skills submitted to analysis are shown in Tables 1, 4 and 7.

Interpretation of the Unrotated Components

It is quite obvious from Tables 1, 4 and 7 that the communality of each item of the reading test is rather high for all the groups.

Fourth-Year Science

Component 1

The loading of each variate on this component in English and Arabic is presented in the following table.

English: This component accounts for 19.68 per cent of the variance. Most of the loadings are positive and significant. This indicates a general reading ability. Items 4 and 5, in the speed-recognition test, and items 14, 15 and 19 in the comprehension test have a negative loading, though not significant. These items stand for simple and very simple recognition and two very simple

TABLE I - Fourth-Year Sciences

Unrotated Components Loadings and Communalities.
(Numbers are rounded to two Decimal Places)

N = 144. 72 English. 72 Arabic. * = Significant. Loadings below 30 are not significant.

Variate	English Components 1	2	3	4	5	6	7	8	9	10	Com-munalities	Arabic Components 1	2	3	4	5	6	7	8	9	10	Com-munalities
1. Speed Recognition:	-.57*	.16	-.37*	-.09	.19	.12	.17	.34*	-.05	-.12	.70	.10	.08	.41*	-.06	-.27	.35*	.55*	.04	.04	.08	.70
2. Complex	.49*	.10	-.10	.50*	-.26	-.08	-.07	.09	.12	.30*	.70	.00	-.31*	-.00	-.34*	.18	.57*	-.20	-.41*	-.09	-.03	.79
3. Simple	-.27	.74*	-.04	-.46*	-.00	.04	-.05	.04	-.04	.18	.87	.12	.29	-.37*	.22	-.05	-.32*	.38*	-.36*	-.06	.31*	.76
4. Very simple	-.12	.76*	-.03	-.43*	-.09	.05	-.00	.03	-.03	.15	.81	.24	-.44*	-.29	.03	.08	.19	.33*	.20	-.28	-.31*	.70
5. Complex	.20	.14	-.07	-.07	.27	.44*	.06	.57*	-.22	-.07	.72	.10	-.15	.30*	-.29	-.36*	-.10	.04	-.09	.40*	-.04	.52
6. Very complex	.28	.09	-.00	.34*	.67*	-.26	.20	.03	.07	.16	.79	.06	.23	-.02	.44*	.45*	.27	.27	-.28	.18	-.10	.72
7. Simple	.40*	.03	-.05	-.40*	.21	-.11	-.50*	.15	.22	.25	.76	.34*	-.12	.28	.10	.53*	-.15	.22	.16	-.19	-.13	.65
8. Complex	.28	.33*	-.40*	.20	-.15	-.19	.04	.25	-.06	.06	.52	.36*	-.12	.18	-.14	-.34*	-.46*	-.00	-.11	-.08	-.38*	.60
9. Very complex	.39*	.01	-.45*	.11	-.20	-.10	.16	.23	-.01	-.05	.50	.39*	.25	.52*	.09	.18	.19	-.08	.27	-.17	.18	.70
Comprehension:																						
10. Inferential	.47*	.42*	-.15	.36*	-.25	.19	.04	.08	-.23	.12	.72	.17	-.32*	-.09	.54*	-.17	-.31*	-.02	-.03	.27	-.08	.64
11. Inferential	.18	.37*	-.09	.35*	.09	-.18	-.17	-.44*	.23	.18	.65	.24	-.57*	.32*	-.07	-.22	-.00	.05	.22	.03	.23	.64
12. Fairly simple inference	.37*	.25	-.36*	-.06	.36*	.25	-.05	.12	.20	-.22	.62	.04	-.38*	-.19	.05	.25	.19	-.19	.55*	.43*	.10	.82
13. Seen in text	.11	-.56*	.09	.29	.19	-.23	-.31*	.39*	-.13	.00	.77	-.20	-.11	-.17	-.45*	.15	-.15	.55*	.17	.23	.00	.71
14. Very simple inference	.00	-.16	-.02	-.28	-.21	-.33*	.67*	.21	.30*	.19	.98	-.23	-.15	-.43*	-.34*	.16	.01	.04	-.08	.04	.38*	.56
15. Very simple inference	-.18	.09	.30*	.12	-.34*	.36*	-.24	.22	.58*	-.01	.83	-.00	.16	.39*	-.10	.22	-.38*	-.08	.16	-.29	.47*	.72
16. Highly inferential	.45*	.29	.42*	-.16	-.08	-.38*	.12	.20	-.02	-.25	.76	.49*	.06	.28	.30*	-.06	.20	-.05	.02	.20	.20	.54
17. Inferential	.34*	.42*	.53*	.11	-.23	-.07	-.10	-.10	-.16	-.39*	.84	.61*	-.39*	.02	-.07	-.26	.13	.00	-.26	-.07	.18	.72
18. Fairly simple inference	.31*	.02	.48*	.19	.30*	.28	.31*	-.03	.34*	.07	.75	.48*	-.51*	-.11	-.17	.13	-.29	-.19	-.19	-.11	.07	.72
19. Seen in text	-.16	.06	.44*	.17	.16	.39*	.22	-.04	-.24	.43*	.72	.02	.08	.42*	-.48*	.32*	-.21	.14	-.04	.15	-.07	.61
20. Inferential	.58*	-.28	.01	-.32*	.12	-.04	-.13	-.22	.07	-.18	.64	.57*	.22	.12	-.28	.30*	.09	-.24	-.15	.25	.06	.71
21. Seen in text	.44*	-.56*	-.17	-.24	-.13	.28	.09	-.11	-.05	.03	.71	.36*	.68*	-.36*	-.10	-.11	.06	-.06	.11	.16	.05	.79
22. Highly inferential	.69*	-.02	.44*	-.09	-.10	-.12	-.15	.05	-.25	.19	.83	.63*	.19	-.18	.09	.38*	-.22	-.13	.05	-.05	-.16	.71
23. Inferential	.67*	-.21	.27	-.29	.00	-.09	.02	-.05	-.03	.17	.69	.52*	.30*	-.25	-.28	-.25	.11	.01	.20	-.38*	-.23	.81
24. Very simple inference	.46*	-.53*	-.10	-.23	-.26	.21	-.04	-.10	-.01	.24	.74	.46*	.66*	-.40*	-.16	-.09	.02	.00	.06	.13	.02	.86
25. Total of Reading Test	.95*	.20	.10	.00	.05	.04	.00	.04	.08	.06	.97	.96*	-.12	.03	-.05	.03	-.00	.11	.03	.12	.07	.97
26. Academic Mark	.73*	.03	-.10	.10	-.23	.19	.05	.04	.07	-.18	.68	.83*	-.22	.03	.12	.09	.09	.14	-.07	-.04	.15	.82
Percentage of variance	19.68	11.74	7.65	6.86	5.66	5.12	4.56	4.51	3.83	3.27		17.08	10.54	7.80	6.38	6.20	5.79	4.74	4.36	4.24	3.95	
Total Percentage of Variance											73.08											71.08

inferences and an answer seen directly in the text. Yet this may mean that these items are too easy to contribute anything to the general reading ability of university students, or they are testing something specific to them. The highest two loadings are the total of the reading test (.95) and the students' academic mark (.73) which indicate some relationship between them.

Arabic: The Arabic component 1 accounts for 17.08 per cent of the variance. With the exception of items 13, 14 and 15, which stand for an answer seen directly in text, and two very simple inferential answers, all the other loadings are positive. The significant loadings are the majority. This also indicates the existence of a general reading ability which excludes the answers seen in text and the very simple inferential answers. The highest loadings are also the total of the reading test (.96), and the students' academic mark (.83) which indicate the existence of a relationship between them.

Component 2

English: The percentage of variance accounted for by this component is 11.74. In the speed-recognition test item 3 (.74, simple recognition) and item 4 (.76, very simple recognition) are grouped together. Although item 8 (.33, complex recognition) shares with them the positive loading, it is partially separated by its low loading to show a different level of the same skill.

Items 10, 11 and 17 (.42, .37, and .42, all inferential) are grouped together to represent a comprehension ability which is quite different from those of items 13, 21, and 14 (-.56, -.56 and -.53, the first two require an answer seen in text, and the last a very simple inferential answer), in the comprehension test which is a bi-polar. The inferential items are showing an ability which is quite different from the ability required by items whose answers are seen in text or demanding very simple inference.

Arabic: It accounts for 10.54 per cent of the total variance. Items 2 and 4 (-.31 and -.44, complex and very simple recognition) are grouped together. They are indicating an ability which is different from the very complex recognition(items 6 and 9).

In the comprehension test, 5 items are grouped together, 3 inferential (items 10, 11 and 17) and 2 fairly simple inferences (items 12 and 18), by having negative loadings, on the one hand, and on the other, 3 items are grouped together by having positive and significant loadings. Yet among these last three, item 23 (.30, inferential) is partially separated from the other two. Its loading is relatively low.

Component 3

It accounts for 7.65 per cent of the English variance and 7.80 per cent of the Arabic variance.

English: This component separates the speed-recognition test from the comprehension test. The highest two loadings of the speed-recognition test are -.40 (item 8, complex) and -.45 (item 9, very complex recognition) Item number 12 (-.36, fairly simple inference) of the comprehension test shares the same domain with items 8 and 9 of the speed-recognition test.

All the other significant loadings of the comprehension test are grouped together, since all have positive loadings. But as the loadings on some of them are not so high as on the others, there is a partial separation among these items which may indicate the existence of a different level of complexity of either items or passages within an area of similar nature. However, the overlapping of the loadings makes the interpretation rather hard.

Arabic: The significant loadings of the speed-recognition test belong to item 3 (-.37, simple recognition) on the one hand and to items 5 (.30, complex recognition) and 9 (.52, very complex recognition) on the other. The easy recognition, by being separated from the two others, indicates the requirement of a different ability.

Three significant loadings of the comprehension test share the nature of the simple recognition item, since they have negative and significant loadings, too. The loadings are -.43 (item 14, very simple inference), -.36 (item 21, seen in text), and -.40 (item 24, very simple inference). The other three positive loadings, .32, .39 and .42 belong to items 11 (inferential),

15 (very simple inference), and 19 (seen in text). The two very simple inferential answers,which are separated, and the two items the answers to which are seen directly in text, which are also separated, belong to different passages. Perhaps it is the nature of the texts which makes these items different. One of the passages may be more complicated than the others.

Component 4

The percentages of variance in this component are 6.86 and 6.38 for English and Arabic respectively.

English: In the speed-recognition test items 2 (.50, complex recognition) and 6 (.34, very complex recognition) are separated from items 3, 4, and 7, -.46, simple recognition, -.43, very complex recognition, and -.40, simple recognition, respectively. Nevertheless, items 2 and 6 are partially separated, for there is a notable difference between their loadings.

Items 10 and 11 (.36 and .35, both inferential) are separated from another inferential item (item 20, -.32). This may also be attributed to the different nature of the passages. Item 20 shares the nature of simple recognition in the speed-recognition test.

Arabic: Item 2 (-.34, complex recognition) is separated from item 6 (.44, very complex recognition) in the speed-recognition test.

Item 10 (.54, inferential), item 16 (.30, highly inferential) are separated from items 13 (-.45, seen in text), 14 (-.34, very simple inference), and 19 (-.48, seen in text) in the comprehension test. Items 10, and 16 are also partially separated. This component separates the speed-recognition test from the comprehension test.

Component 5

It accounts for 5.66 per cent of the English variance and 6.20 per cent of the Arabic variance.

English: The only significant loading (.67) in the speed-recognition test belongs to item 6, very complex recognition.

In the comprehension test items 12 (.36, fairly simple inference) and 18 (.30, fairly simple inference) are separated from item 15 (-.34, very simple inference). The fairly simple items of the comprehension test share the nature of the very complex recognition item. Notwithstanding, they are partially separated because of the difference between their loadings.

Arabic: In the Arabic component the two complex recognition items (-.36 and -.34) are grouped together. At the same time they are separated from items 6 (.45, very complex recognition), and 7 (.53, simple recognition), which are partially separated from each other.

In the comprehension test the two inferential and highly inferential

items (20 and 22) of the last passage are grouped together. Item 19 (.32, seen in text) of the second passage shares the nature of the other two items. This may be due to the different level of difficulty . the two passages possess. Since passage two seems more difficult than passage three, this grouping may be justifiable.

Component 6

It accounts for 5.12 per cent of the English variance and 5.79 of the Arabic variance.

English: In the speed-recognition test only item 5 (complex recognition) has a signifiaant loading of .44.

The interpretation of this component is rather difficult, since the loadings are overlapping. All the significant loadings show nearly the same type of ability with the exception of item 14 (-.33, very simple inference) which is separated from the others by its negative loading.

Arabic: In the speed-recognition test, items 1 (.35, speed) and item 2 (.57, complex recognition) are separated from items 3 (-.32, simple recognition) and 8 (-.46, complex). Although each two of these items are grouped together, yet each item is partially separated from the other one in the grouped pair.

In the comprehension test item number 10 (-.31, inferential) of the first reading passage shows a similar ability to that of item number 15 (-.32,

very simple inference) of reading selection number two. Here also the complexity of passage number two might be the reason. At the same time these two items share the same ability with items number 3 and 8 of the speed-recognition test.

Component 7

It accounts for 4.56 of the English variance and 4.74 of the Arabic variance.

English: Item number 7 is singled out. It is the only item with a high significant loading (-.50) in the speed-recognition test.

In the comprehension test item 13 (-.31, seen in text), which shares the nature of item 7, is separated from items 14 (.67, very simple inferential answer), and 18 (.31, fairly simple inference). These last two items are partially separated too. This indicates that two main different types of ability are required for answering these items. One is required for answering items 7 and 13, and the other for answering items 14 and 18. Even the second ability is sub-divided. Perhaps the same ability has two levels of difficulty.

Arabic: The speed, the simple (item 3), and the very simple (item 4), recognition items,are grouped together. Their loadings are .55, .38 and .33, respectively. The only significant loading in the comprehension test is .55. It belongs to item 13, answer seen in text; and this shares the nature of the

speed-recognition test significant items. They apparently measure the same thing.

Component 8

This component accounts for 4.51 per cent and 4.36 per cent of the English variance and Arabic variance respectively.

English: Speed (.34) and item 5 (.57, complex recognition) are the only significant loadings of the speed-recognition test.

In the comprehension test the two significant loadings are those of item 11 (-.44, inferential) and item 13 (.39, very simple inference). Obviously these two items reveal two different abilities, while item 13 (the very simple inference) shares the same ability with the significant items of the speed-recognition test.

Arabic: In the speed-recognition test, items 2 (-.41, complex recognition) and 3 (-.36, simple recognition) are grouped together to exhibit an ability quite different from item 12 (.55, fairly simple inference) of the comprehension test.

Component 9

It accounts for 3.83 of the English variance and 4.24 of the Arabic variance.

English: Only three items of the comprehension test have significant positive loadings. Items 14, 15, and 18 (.30, very simple inference,

.58, very simple inference, and .34, fairly simple inference) are grouped together to show three similar abilities, though partially separated.

Arabic: Item 5, (.40, complex recognition) has the only signifiaant loading in the speed part of the test. It shares the nature of item 12 (.43, fairly simple inference), while both are separated from item 23 (-.38, inferential). Hence two different abilities are identified here.

Component 10

The percentage of variance accounted for by this component is 3.27 in the English component, and 3.95 in the Arabic component.

English: The only significant loading (.30) of the speed-recognition test belongs to item 2, complex recognition.

The two significant items of the comprehension test are number 17 (-.39, inferential) and number 20 (.43, seen in text). This shows that the inferential item requires an ability which is different from that of the item the answer to which is seen directly in the reading text. At the same time the item to which the answer is expressed directly in the reading passage shares the ability that is required to answer item 2 of the speed-recognition test.

Arabic: In the speed-recognition test, items 3 (-.31, simple recognition) and 4 (-.31, very simple recognition) are grouped together. The very simple

inferential items (14 and 15) in the comprehension test are grouped together too. But the comprehension loadings (.38 and .47), being positive, require an ability which is different from those of the speed-recognition significant items.

The Interpretation of the Rotated Components (Tables 2 and 3)

Since some of the unrotated components are not very clear, it seems necessary to interpret the rotated components.

Component 1

English: Only item 1 (.41, speed) and item 7 (.44, simple recognition) have the two significant loadings out of the nine speed-recognition test items. Five loadings of the comprehension test are significant; some highly significant and some moderately significant. The highest two belong to items 24 (.77) and 21 (.73) which represent very simple inferential answers. The second two highest loadings are those of items 23 (.70) and 20 (.66), which require inferential ability to answer them. Item number 22 (.54, highly inferential) is partially separated from the above mentioned four items, and is in agreement with the loading of the total of the reading test (.58). This indicates that the highly inferential answer at this advanced stage is really what represents reading comprehension.

Loading (.45) of the academic marks shares the nature of the total of reading ability. This may mean that improvement in one of them may be followed by an improvement in the other.

The loadings of the total of the reading test and the academic marks are highly significant in both the English and Arabic components.

Arabic: Six of the comprehension items are positively significant. Three of them are inferential (.46, .79 and .38), two highly inferential (.44 and .35), and a fairly inferential item. This indicates that though items 11, 17, and 20 are all inferential, yet they are partially separated. Especially items 17 and 20 require somewhat different abilities, if not in nature, in level of complexity. The highest loading in this component is that of the total of the reading test (.86). This is a clear indication that this component represents general reading ability. The second high loading is that of the students' academic mark (.84) which shows a high relationship between reading ability and achievement in other subjects of the curriculum.

Component 2

English: The highest two positive loadings are .89 and .88, which belong to items 3 and 4, the simple and very simple recognition. Item 7 (.31, simple recognition) is partially separated from the two others.

The only significant loading (-.67) in the comprehension test is that of item 13, which requires an answer found directly in the reading selection. The speed-recognition test is separated from the comprehension test in this component. The compcnent may be called simple recognition.

Arabic: The highest loading in this component belongs to items 24 (.92, very simple inferential answer), and 21 (.84, answer seen in text). Items 20 (.42, inferential) and 22 (.43, highly inferential) are grouped together, while the other inferential loading, .66, which belongs to item 23, is partially separated. The total of the reading test is rather low in this component. This indicates that these items require rather different types or levels of abilities. The component represents the simple inferential answer of item 24, and the seen in text answer of item 21, which are almost identical.

Component 3

English: The highest loading (.83) represents the ability to react to items the answer to which is directly seen in text. This loading is separated from loading (-.35) of item 12, the fairly simple inferential answer. At the same time it is partially separated from another fairly simple inferential answer, which seems to be quite different from the first fairly simple inferential answer, that belongs to item 18 (.31). Obviously different abilities are needed to react to these items. The component might be named after item 19 (.83), the answer to which is seen in text.

Arabic: The highest loading (-.55) in the speed-recognition test is the loading of item 9, very complex recognition. It is clearly separated from item 3, (.38), which is simple recognition.

In the comprehension test the two highest positive loadings are .64 and .67. They belong to items 13 and 14, the answer to which is seen in text and the very simple inferential answer. Although they share the nature of item 3 of the speed-recognition test, yet they are partially different because of the rather high loadings. They certainly represent an ability which is completely different from that required by item 16 (-.38), the highly inferential. The component then represents an ability required by items 13 and 14.

Component 4

English: The highest two loadings (.74 and .72), which belong to items 2 and 10, reveal the complex recognition requires a similar ability to that of the inferential answer in the comprehension test. The second two items which are grouped together are 8 (.64) and 9 (.56). Although both are positive, yet they show two slightly different levels of an ability, since their loadings are rather different. Item 11 (.32, inferential) has the lowest loading of all. That certainly suggests that there is a difference in the ability required by this item, whether in kind or level, from those required by the others, and each of the three groups may be measurable separately. Items 25 (.49,

total of the reading test) and .26 (.50, the academic mark) formed the fourth group, which shows similarity to the group that combined items 8 and 9.

Arabic:

Item 19 (.73), the answer to which is directly found in the reading passage, exhibits the highest positive loading in this component. All the other significant loadings are either comparatively low or negative. Thus this may indicate that an ability to answer a question whose answer is seen in the text is different from the others and could be measured separately. The component may be named after item 19.

Component 5

English: The highest loading in this component (.79) stands for an ability to answer a very complex recognition (item 6). The component may be called difficult recognition. The next highest loading (.53, fairly simple inference) requires rather similar ability, though not quite the same. The two inferential items (numbers 10 and 11) are grouped with the speed item. The speed is very slow and thus corresponds to the inferential items.

Arabic: The Arabic component's highest loading is also of item 6 (.82, the very complex recognition). It is singled out. The ability to answer this item is hence different from all the others, and can be measured

separately. This component can also be called complex recognition.

Component 6

English: The highest two loadings of this component are .54 and .53. They belong to item 7 (simple recognition) and item 13 (answer seen in text). Speed (-.41), the first item, is separated from these two items. Item 22, (.32,,highly inferential) is on the border line. Hence it does not add much meaning to this component. The component hence represents the simple recognition plus the answer seen in text which might be identical.

Arabic: This component represents item 2, since it has the highest positive loading. As it is singled out, it implies the existence of a special ability which is distinct from all the others.

Component 7

English: The only significant loading is the loading of item 14 (.93, the very simple inference). Thus a distinct ability is established in this component also.

Arabic: Speed is the highest positive loading (.81) in this component. Hence the component may be called speed.

Component 8

English: Item 5 (complex recognition) possesses the highest positive loading (.81). It is separated sharply from item 11 (-.54, inferential). The

component is complex recognition.

Arabic: The highest positive loading is shown by item 12 (.88, fairly simple inference). The second significant loading is .49 (item 3, simple recognition). These two items obviously require two different abilities. The component represents simple inference.

Complex 9

English: This component stands for item number 15, the very simple inference, since it has the highest loading (.89).

Arabic: The Arabic component 9's highest loading is .73, which measures very easy recognition. It certainly shows an ability which is quite distinct from that of items 5 (-.31), the recognition of a complex idea. Items 7 (.45, simple recognition) and 23 (.42, inferential answer) are moderately significant. There is something in them that is similar to that of item 4 which is represented by the component.

Component 10

English: The highest two loadings, which join the highly inferential ability and the inferential ability, are .79 and .85 respectively. Items 22 (.56, highly inferential) seems to be more highly or less highly inferential than item 16. Items 23 (.34, inferential), which is also different from the previous inferential item, is grouped with item number 25 (.44, the total

TABLE 2

Fourth-Year Science, English. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places)

Variate	Component Number									
	1	2	3	4	5	6	7	8	9	10
1. Speed	.41*	.14	-.20	.29	.34*	-.41*	-.15	.03	-.29	.00
2. Complex	.11	-.17	.09	.74*	.12	.14	-.01	-.18	.17	.07
3. Simple	-.22	.90*	.02	-.06	-.03	.08	-.01	.07	-.02	.02
4. Very simple	-.14	.88*	.01	.06	-.04	.01	.01	.06	.01	.12
5. Complex	.03	.08	.10	.14	.13	.04	-.10	.81*	.01	.02
6. Very complex	-.05	-.12	.08	.10	.79*	.12	.06	.01	-.27	.05
7. Simple	.44*	.31	-.28	.02	.28	.54*	-.15	.04	.11	.01
8. Complex	-.13	.12	-.22	.64*	.05	.07	.07	.09	-.13	.03
9. Very complex	.12	-.09	-.29	.56*	-.02	-.06	.19	.17	-.12	-.04
10. Inferential	.08	.14	.19	.72*	.01	-.21	-.25	-.00	-.05	.18
11. Inferential	-.07	.14	-.02	.32	.39*	-.04	-.26	-.54*	.04	.01
12. Fairly simple inference	.14	.17	-.35	.20	.44*	-.18	-.20	.37	.07	-.08
13. Seen in text	.03	-.67*	-.05	-.01	-.03	.53*	-.07	.16	-.06	-.00
14. Very simple inference	.08	.04	-.04	.00	.01	-.03	.93*	-.05	-.01	-.01
15. Very simple inference	-.12	.04	.04	-.02	-.14	.04	-.02	-.00	.89*	.01
16. Highly inferential	.09	.11	-.14	.08	.13	.11	.21	.05	-.04	.79*
17. Inferential	-.03	.08	.06	.11	-.05	-.18	-.21	-.07	.08	.85*
18. Fairly simple inference	.14	-.16	.31	-.09	.53*	-.28	.08	.10	.37	.30
19. Seen in text	-.06	.05	.83*	-.10	.08	-.03	-.05	.10	.05	-.03
20. Inferential	.66*	-.11	-.30	-.11	.17	-.04	-.10	-.03	-.09	.19
21. Seen in text	.73*	-.26	-.04	.03	-.15	-.17	.08	.14	-.06	-.18
22. Highly inferential	.54*	-.04	.23	.21	.04	.32	-.08	.00	-.08	.56*
23. Inferential	.70*	-.04	.07	.04	.15	.16	.13	-.02	-.08	.34*
24. Very simple inference	.77*	-.20	.05	.11	-.21	.01	.10	.00	.02	-.17
25. Total	.58*	.06	-.03	.49*	.41*	.00	-.07	.11	.06	.45*
26. Academic Mark	.45*	-.12	-.17	.50*	.06	-.24	-.07	.16	.14	.27

TABLE 3

Fourth-Year Science, Arabic. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places)

* Significant

Variate	Component Number									
	1	2	3	4	5	6	7	8	9	10
1. Speed	.10	-.02	-.09	.11	.06	.03	.81*	-.10	.05	-.01
2. Complex	.21	-.19	.07	.02	.06	.80*	-.05	.01	-.01	-.24
3. Simple	.16	.25	.38*	-.22	.29	-.36	-.01	-.49*	-.10	.09
4. Very simple	.25	-.09	.10	-.13	-.00	.03	.04	.11	.73*	-.22
5. Complex	.19	-.09	-.02	.35	-.33	-.09	.26	.02	-.31	-.25
6. Very complex	-.01	.03	-.07	.01	.82*	-.01	.05	-.05	.03	-.14
7. Simple	.24	-.13	-.16	.36	.31	-.10	-.07	.06	.45*	.33
8. Complex	.29	.02	-.22	.37	-.40	-.34	-.10	-.27	.04	-.25
9. Very complex	.20	.19	-.55*	-.01	-.09	.04	.38	.06	-.04	.39
10. Inferential	.28	-.23	-.12	-.17	.07	-.58	-.18	.09	-.08	-.26
11. Inferential	.46*	-.12	.29	-.31	-.33	-.10	.01	.27	.20	-.06
12. Fairly simple inference	.09	-.05	.12	-.05	.01	-.05	-.10	.88*	.05	-.06
13. Seen in text	-.14	-.00	.64*	.38	-.06	-.12	.24	.11	.20	-.06
14. Very simple inference	-.02	.01	.67*	-.12	-.05	.22	-.12	.09	-.10	.08
15. Very simple inference	-.01	-.07	-.02	.16	-.09	-.08	-.04	-.08	-.12	.81*
16. Highly inferential	.44*	.12	-.38*	-.05	.21	-.09	.23	.17	-.20	.07
17. Inferential	.79*	-.03	-.05	-.11	-.18	.14	.10	-.10	-.00	-.11
18. Fairly simple inference	.66*	-.14	.12	.12	-.20	.04	-.43	-.02	.11	.04
19. Seen in text	-.03	-.05	.08	.73*	-.01	.10	.08	-.03	-.05	.20
20. Inferential	.38*	.42	-.18	.45	.16	.26	-.17	.11	-.15	.01
21. Seen in text	-.01	.87*	-.01	-.05	.07	-.06	.01	-.00	-.13	-.02
22. Highly inferential	.35*	.43*	-.17	.19	.24	-.14	-.42	.03	.24	.12
23. Inferential	.18	.66*	-.17	-.06	-.31	.13	.05	-.17	.42	-.01
24. Very simple inference	.08	.92*	.04	-.00	.10	-.06	-.01	-.07	-.07	-.04
25. Total	.86*	.35	-.14	.20	.04	-.10	.07	.11	.15	.01
26. Academic Mark	.84*	.15	-.12	.02	.17	-.03	.07	.04	.20	.07

of the comprehension test). This component shows that the representatives of a comprehension test are the inferential and highly inferential items.

Arabic: Item 15, the very simple inference, has the highest loading (.81). As it is distinctly high it represents the component.

Fourth-Year Arts

The interpretation of the components, unrotated or rotated, or every two components, are accompanied by tables.

Unrotated Component 1

This component accounts for 17.95 per cent of the English variance and 15.94 per cent of the Arabic variance.

English: The highest loading in this component is .91, the total of the comprehension test. Most of the other loadings are positive and significant Hence, this component exhibits a general reading ability. Speed (.56), which shares the same area as that of most of the comprehension items, does not agree with the highly inferential items (-.56, item 11). This means that to answer this item, the students should read even slower than their slow habitual reading. The academic mark's loading is the second highest mark in this component (.80).

TABLE 4 - Fourth-Year Arts

Unrotated Components Loadings and Communalities.
(Numbers are rounded to Two Decimal Places)

N = 60. 30 English. 30 Arabic. * = Significant.

Loadings below 30 are not significant.

Variates	English Components										Com-	Arabic Components									Com-
	1	2	3	4	5	6	7	8	9	10	munalities	1	2	3	4	5	6	7	8	9	10	munalities
1. Speed	.56*	.26	.34*	.04	-.02	-.03	.01	.20	-.30*	.31*	.73	-.03	-.33*	.00	.58*	.14	-.16	.12	.16	-.45	.30*	.82
Recognition:																						
2. Complex	.11	-.63*	.19	-.29	-.36*	-.26	-.18	-.20	-.16	.06	.83	.04	-.28	.05	.32*	.17	-.34*	.15	.64*	.18	-.06	.80
3. Simple	.23	.63*	.17	.21	-.05	-.23	.07	-.16	-.05	-.07	.62	.08	.47*	-.15	.09	-.00	-.28*	.64*	-.16	.25	-.07	.84
4. Very simple	.12	.34*	-.23	-.12	-.23	-.46*	-.02	.48*	.01	.46*	.90	.20	-.07	.56*	.03	-.02	.70*	-.03	.10	-.02	.06	.86
5. Complex	.10	.56*	.28	.06	-.19	-.37*	-.38*	-.25	.08	-.06	.79	.29	.60*	-.11	.02	.01	.22	.45*	.06	-.15	-.12	.75
6. Very complex	-.07	.17	.20	-.71*	.44*	-.07	-.03	.02	.16	.14	.83	.10	.25	.50*	.41*	.29	-.02	.06	-.45*	-.07	.25	.81
7. Simple	-.06	-.30*	.34*	.10	-.29	.26	-.32*	.32*	.53*	-.00	.86	.29	-.25	-.28	.23	-.22	-.13	.06	-.40*	.46*	-.22	.77
8. Complex	.27	.17	.28	.17	.55*	-.10	-.38*	.13	.24	-.19	.78	.19	.04	-.17	34*	.69*	-.02	-.11	-.25	.04	-.27	.81
9. Very complex	-.12	.57*	-.01	.50*	.23	.26	.22	.09	-.00	.30*	.86	.17	.02	-.30*	.75*	-.18	-.11	-.04	.10	-.17	-.10	.78
Comprehension:																						
10. Inferential	.51*	-.60*	-.06	.08	.20	.16	.16	-.29	.28	.20	.90	.10	.41*	.44*	-.14	-.40*	-.25	.33*	.25	.17	-.00	.81
11. Highly inferential	-.56*	-.22	-.47*	.00	-.04	.17	.15	-.20	.29	.22	.81	.45*	.29	-.25	-.33*	.07	-.23	-.44*	.02	-.06	-.12	.73
12. Fairly simple inference	-.09	-.05	.66*	-.34*	.07	.28	.06	.28	-.26	-.13	.88	-.34*	.48*	-.42*	.06	-.19	.12	-.07	.04	-.48*	-.35*	.94
13. Seen in text	.34*	-.00	.05	.03	.69*	-.43*	-.12	-.12	.02	-.19	.85	.44*	-.39*	.28	-.07	-.51*	.26	.06	.04	-.03	-.20	.80
14. Inferential	.46*	-.44*	.50*	-.15	.21	.03	.22	-.16	-.19	.18	.87	.40*	.21	.15	.36*	.08	.23	-.36*	.21	.52*	-.03	.86
15. Inferential	.26	-.14	-.63*	-.27	-.00	.05	-.15	.27	-.34*	-.25	.83	.49*	.39*	-.37*	-.21	.15	.32*	-.12	.31*	.01	.21	.85
16. Seen in text	.19	-.00	.16	.75*	-.29	-.11	-.07	-.18	-.16	-.05	.79	.02	-.55*	-.36*	.17	-.34*	.01	.17	.04	-.03	.28	.69
17. Fairly simple inference	.44*	-.23	-.29	.14	.16	.63*	.05	.39*	-.07	-.09	.94	.08	.42*	-.44*	-.04	-.49*	-.07	-.17	-.23	-.05	.25	.77
18. Very simple inference	-.31*	-.11	.54*	-.03	-.44*	-.18	.15	.12	.17	-.12	.73	.20	-.06	.62*	.21	.35*	-.34*	-.33*	-.28	-.16	-.07	.93
19. Fairly simple inference	.67*	.11	-.04	.27	-.06	-.22	.17	.17	.04	-.37*	.82	.61*	.13	-.16	-.09	.08	-.17	-.06	-.06	.10	.51*	.74
20. Inferential	.70*	-.08	-.20	-.03	-.23	-.12	-.21	-.14	-.03	-.01	.67	.52*	-.34*	.16	-.45*	.03	-.40*	-.11	.04	-.16	-.11	.83
21. Very simple inference	-.12	.30*	.03	-.23	-.11	.06	.73*	-.08	.14	-.30*	.82	.30*	-.45*	-.30*	.19	-.08	.49*	.21	-.26	-.00	-.05	.78
22. Fairly simple inference	.40*	.34*	-.29	-.40	-.38*	-.09	-.04	.03	.19	-.17	.74	.60*	-.20	.02	-.49*	.18	.05	.24	-.20	-.11	.10	.80
23. Fairly simple inference	.46*	.57*	.10	-.28	-.05	-.00	.04	-.06	.27	.13	.72	.51*	-.38*	.09	-.27	.27	-.10	.29	.00	-.19	-.19	.72
24. Seen in text	-.26	.46*	-.14	-.32*	-.10	.41*	-.29	-.38*	-.21	.03	.85	.40*	-.55*	-.48*	.03	-.05	-.05	-.09	-.08	.12	-.05	.73
25. Total of Reading Test	.91*	.18	.18	-.19	-.06	.11	.02	.01	-.03	-.10	.96	.94*	.21	.04	.18	-.03	-.10	.03	.06	-.08	.05	.99
26. Academic Mark	.80*	-.02	.36	.00	-.19	.15	.06	.01	-.12	.04	.85	.77*	.25	.22	.37*	-.11	.04	-.03	.08	-.14	-.12	.90
Percentage of variance	17.95	12.54	9.91	8.67	7.59	6.35	4.98	4.67	4.31	3.91		15.94	12.09	10.03	9.47	6.91	6.58	5.77	5.26	4.82	3.93	80.84
Total Percentage of Variance											80.84											

Arabic: The loading of the total of the reading test is the highest of all in this component, also (.94). The average of the academic mark has the second highest loading (.77). All the significant loadings are positive with the exception of item 12 (fairly simple inference), which indicates measuring something specific. This component also represents a general reading ability, but the speed-recognition items are excluded.

Unrotated Component 2

It accounts for 12.54 per cent of the English variance and 12.09 per cent of the Arabic variance.

English: Six out of nine loadings in the speed-recognition test are significant. Item 2 (-.63), which requires complex recognition, and item 7 (-.31), which demands simple recognition, are partially separated. Although both loadings are negative, yet there is a great difference between the loadings. Items 3 (.63, simple recognition), 4 (.34, very simple recognition), 5 (.56, complex recognition), and 9 (.57, very complex recognition) are completely separated from the first two. They might require an ability which needs deeper thinking than the other two. They are, at the same time, separated pattially from each other to indicate different levels of difficulty.

In the comprehension test items 10 (-.60, inferential) and item 14 (-.44, inferential) are separated from items 21 (.30, very simple inference),

22 (.34, fairly simple inference), 23 (.57, fairly simple inference). This suggests that each of these groups requires an ability which is different from the other.

Arabic: The speed-recognition test has three significant loadings, one negative (-.33, speed), and two positives (.47, item 3, simple recognition and .60, item 5, complex recognition).

Eleven items of the comprehension test have significant loadings. Six of them are negative, and four are positive. This bi-polar component divides the comprehension test into two main groups. The first group consists of item 13 (-.39, seen in text), 16 (-.55, seen in test), 20 (-.34, inferential), 21 (-.45, very simple inference), 23 (-.38, fairly simple inference) and 24 (-.55, seen in text).

Group two is composed of items 10 (.41, inferential), 12 (.48, fairly simple inference), 15 (.39, inferential), and 17 (.42, fairly simple inference). The reason that some complex inferential items are grouped together with simple inferential items or very simple inferential items may be due to the difference between the structure of the English and the Arabic languages. Hence some of the items which seemed complex in English were not so in Arabic, and vice versa.

Some of the items have significant loadings, in both the English and the Arabic tests.

Unrotated Component 3

It accounts for 9.91 per cent and 10.03 per cent of the English variance and the Arabic variance respectively.

English: In the speed-recognition test two items have significant loadings. Each of item1, speed, and item 7, simple recognition, has a .34 loading.

There are five significant loadings in the comprehension test. Two of them are negative and three are positive. Item 11 (-.47, highly inferential) is grouped with item 15 (-.63, inferential). They are, at the same time, separated from items 12 (.66, fairly simple inference), 14 (.50, inferential) and 18 (.54, very simple inference) which are grouped together. Since the loadings within each group are of different weights, then the loadings within groups are partially separated.

Arabic: The two positive significant loadings of the speed-recognition test (.56 and .50) belong to items 3, very simple recognition, and item 6, very complex recognition. Loading -.30 of item 9, the very complex recognition, seems to be the complex item in the Arabic test. The other two, the very simple and the very complex recognition, seem to require the same ability.

The comprehension items 12 (-.42, very simple inference), 15 (-.44, fairly simple inference), 21 (-.30, very simple inference), and 24 (-.48, seen in text) are significant and negative. Items 10 (.44, inferential) and 18 (.62, very simple inference) are grouped together since

they are positively significant. But, as has already been pointed out, the items are partially separated within the groups, and completely separated between the groups. The two main abilities required are of completely different natures, while a group of similar abilities are needed within each of the two main abilities.

Unrotated Component 4

The percentage of variance accounted for by this component is 8.67 per cent of the English component and 9.47 of the Arabic component.

English: The two very complex recognition items, numbers 6 and 9, are separated. Loading of item 6 is -.71 and loading of item 9 is .50.

The highest loading of the comprehension test is .75 (item 16, seen in text). The next two significant loadings which are grouped together and separated from item 16 are -.34 (item 12, fairly simple inference), and -.32 (item 24, seen in text). Although both items 16 and 24 seem to be of the same type (answer seen in text), component analysis shows that they are different and require different kinds of ability. Perhaps this is so because they belong to different passages which might be of different levels of difficulty.

Arabic: This component separates the speed-recognition test from the comprehension test. All the loadings of the speed-recognition test are positive. Items 1 (.58, speed), 2 (.32, complex recognition), 6 (.41, very complex

recognition), 8 (.34, complex recognition), and 9 (.75, very complex recognition). Although all these loadings are positive, they are partially divided. Certainly loading .75 is different from loading .32. The first is highly significant and the second is just on the border line of significance.

Items 11 (-.33, highly inferential), 20 (-.45, inferential), and 22 (-.49, inferential) are grouped together. Items 20 and 22 show the requirement of the same ability, while item 11 demands a slightly different type of ability. Item 14 (.36, inferential) is completely separated from the other three and grouped with item 26 (.37, the academic mark).

Unrotated Component 5

The percentage of variance accounted for by this component is 7.59 per cent of the English component and 6.91 percent of the Arabic component.

English: Items 2 (-.36, complex recognition), 6 (.44, very complex recognition) and 8 (.55, complex recognition) are divided into two groups which require two distinct abilities. Items 6 and 8 are shown to be partially different also.

In the comprehension test, items 18 (-.44, very simple inference) and 22 (-.38, fairly simple inference) are grouped together to show an ability which is quite different from that of item 13 (.69, seen in text).

Arabic: The only significant item of the speed-recognition test is item 8 (.69, complex recognition), which is significant in the English test also.

In the comprehension test the loadings of items 10 (-.40), 13 (-.51), 16 (-.34) and 17 (-.49), which are inferential, seen in text, seen in text, and fairly simple inferential items, respectively. Although they are partially separated to a certain extent, they are grouped together in a broad sense. Item 18 (.35, very simple inference), shows a different ability. The item is multiple-choice answer.

Unrotated Component 6

This component accounts for 6.35 per cent of the English variance and 6.58 per cent of the Arabic variance.

English: The speed-recognition test is again separated from the comprehension test in this component. Most of the speed-recognition's loadings are negative, and the majority of the comprehension loadings are positive. The two significant loadings in the speed-recognition test are -.46, and .47, (items 4 and 5, very simple and complex recognition) which show the existence of two distinct abilities.

The two 'seen in text' items, 13 and 24, (-.43 and .41) are separated from each other, exhibiting different abilities. This may be so because they belong to different passages. Item 13 (.41) is sharing the nature of item 17 (.63, fairly simple inferential), though partially separated.

Arabic: Item 2 (-.34, complex recognition) is separated from item 4 (.70; very simple recognition) in the speed-recognition test.

Items 15 (.32, inferential) and 21 (.49, very simple inference) are grouped together to be separated from items 18 (-.34, very simple inference) and 20 (-.40, inferential). Item 21 is a multiple-choice answer. This perhaps made item 18 more difficult and hence it is separated from item 21.

Unrotated Component 7

It accounts for 4.98 per cent of the English variance and 5.77 per cent of the Arabic variance.

English: The three significant loadings, -.38, -.32 and -.38 (items 5, complex recognition, 7, simple recognition, and 8, complex recognition) of the speed-recognition test are grouped together. The complex recognition loadings are exactly the same. This indicates that items 5 and 8 measure the same ability.

The only significant loading in the comprehension test is the loading of item 21 (.73, very simple inference). It is separated from the speed-recognition test.

Arabic: The significant loadings .64 and .45 in the speed-recognition test belong to items 3 (simple recognition) and 5 (complex recognition). Though both are positive, yet they are partially separated.

In the comprehension test three items are grouped together by their negative loadings. But they are partially separated from each other and

completely separated from item 10 (.33). The loadings are -.44 (item 11, highly inferential), -.36 (14, inferential) and -.33 (18, very simple inference). The last item belongs to another passage. This perhaps made it more complex than it seemed to be.

Unrotated Component 8

The percentage of variance accounted for by this component is 4.67 per cent of the English component and 5.26 per cent of the Arabic component.

English: Items 4 (.48, very simple recognition) and 7 (.32, simple recognition) are partially separated.

In the comprehension test item 17 (.39, fairly simple inference) is separated from item 24 (-.38, seen in text).

Arabic: The Arabic component groups items 6 (-.45, very complex recognition), and 7 (-.40, simple recognition), together to exhibit a different ability to that of item 2 (.64, complex recognition).

The only significant item in the comprehension test is 15 (.31, inferential).

Unrotated Component 9

This component accounts for 4.31 per cent of the English variance and 4.82 per cent of the Arabic variance.

English: Item number 7 (.53, simple recognition) has the only significant loading in the speed-recognition test.

Item 15 in the comprehension test has a loading of .34 which is the only significant one, and represents an inferential answer.

Arabic: Item 7 has also the only significant loading in this component.

In the comprehension test, items 12 (-.48, fairly simple inference) and 14 (.52, inferential) are separated. Hence they require two different abilities.

Unrotated Component 10

This component accounts for 3.91 per cent of the English variance and 3.92 per cent of the Arabic variance.

English: Items 1 (.31, speed), 4 (.46, very simple recognition) and 9 (.30, very complex recognition) are grouped together but item 4 is partially separated from the other two.

In the comprehension test items 19 (-.37, fairly simple inference) and 21 (-.30, very simple inference) are grouped together.

Arabic: Speed (.30) is the only significant item in the speed-recognition test.

In the comprehension test, items 12 and 19 (-.35 and .51) are separated from each other. Although both items are fairly simple inferences, component analysis separated the multiple choice (19) from the supply item.

Interpretation of the Rotated Components

Fourth-Year Arts

Component 1[1]

English: All the significant loadings are positive and contribute to the total test loading (.82). Hence, this could be taken as a general reading ability. The highest loadings are those of the academic mark (.86), the test's total (.82), speed (.77), and item 14 (.68, inferential).

Arabic: The Arabic component one is a bi-polar. Items 9, 14, and 17's loadings, -.33, -.37 and -.31, are on the border line of significance. Two of the positive significant loadings are also on the border line, that of items 13 (.33, seen in text) and 25 (.32, total of the reading test). Three loadings are highly significant. They are .81 (item 23, fairly inferential), .77 (22, fairly inferential), and .76 (20, inferential).

Component 2

English: The highest two loadings are .81 (item 5, complex recognition) and .74 (24, seen in text). Hence these two loadings represent an ability which this component stands for.

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1. See the attached table at the end of the interpretation of all components.

Arabic: There are six significant loadings in this component, but the highly significant loadings are .78 (item 7, simple recognition), and .69 (21, very simple inference). Two moderately significant loadings are those of items 13 (.41, seen in text) and 16 (.57, seen in text). Nevertheless, the component represents an ability required by items 7 and 21.

Component 3

English: The highly significant loadings in this component belong to item 11 (.85, highly inferential) and item 10 (.74, inferential) which are separated from item 12 (.60, fairly inferential). Items 11 and 10 are also partially separated.

Arabic: Item 17 (fairly inferential) has the highest significant loading, .93. Hence component 3 stands for fairly simple inferential answer.

Component 4

English: The highly significant loadings in this component are two, one with a positive loading .83, seen in text, and the other with a negative loading -.85, complex recognition. This suggests that two different abilities, which are required by these two items, are represented by this component.

Arabic: Since the highly significant loading .87 belongs to speed, this component represents speed.

Component 5

English: Items 8 (.81, complex recognition) and 13 (.81, seen in text), have the highest loading. Thus the component represents them.

Arabic: In the Arabic component loading .88 of item 7 is singled out. It is different from loading of items 13 (-.39), 10 (-.51, inferential) and 16 (-.33, seen in text). The component then exhibits an ability that is required by item 8, complex recognition.

Component 6

English: Loadings of items 15 (.82, inferential) and 17 (.75, fairly simple inference) are the highest in this component. Yet they are partially separated.

Arabic: Loading .90, which belongs to item 4, very simple recognition, is the highest in this component. Thus the ability required by this item is revealed through this component.

Component 7

English: Loading of item 21 (.83, very simple inference, multiple-choice) is singled out in this component.

Arabic: Loading of item 3, .87 (simple recognition), is the highest. The two other significant loadings are those of items 5 (.64, complex recognition) and 10 (.54, inferential). These loadings are partially separated.

Component 8

English: Loading of item 4 (.92, very simple recognition) is the highest, and hence the representative of the component.

Arabic: Loading .84, which belongs to item 2, complex recognition, represents the component, since it is the highest.

Component 9

English: Item 7 (simple recognition) has the highest loading (.91) in this component.

Arabic: This represents a general reading ability, since the highest component is that of the total of the reading test (.81) and all the other significant loadings are positive and contributing to the total. The next highest loading (.64) is that of the academic mark.

Component 10

English: The two highly significant loadings are those of item 2 (-.81, recognition of a complex idea) and item 9 (.88, recognition of a very complex idea). This component, then, shows that these two items require two different abilities.

Arabic: The loading of item 12 (.84, fairly simple inferential answer) is singled out to represent an ability revealed through this component.

TABLE 5

Fourth-Year Arts, English. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places) * Significant

Variate	Component Number									
	1	2	3	4	5	6	7	8	9	10
1. Speed	.77*	.02	-.10	.06	.06	-.03	-.15	.25	-.09	.16
2. Complex	.16	-.17	.05	.02	-.20	-.14	-.21	-.08	.05	-.81*
2. Simple	.25	.31	-.12	.27	.25	-.25	.25	.26	-.25	.23
4. Very simple	.10	-.14	-.03	-.08	-.10	.00	-.09	.92*	-.05	.10
5. Complex	.26	.81*	-.10	.10	.07	-.13	-.02	-.04	.17	.17
6. Very complex	.06	.08	-.10	-.85*	.22	-.15	.04	.06	-.08	-.05
7. Simple	-.01	.01	.00	.04	-.02	-.07	-.13	-.05	.91*	-.09
8. Complex	.14	.08	-.06	-.06	.81*	-.01	-.14	-.05	.18	.17
9. Very complex	.02	.10	-.03	.14	-.04	-.14	-.04	-.06	-.11	.88*
10. Inferential	.28	-.33	.74*	-.02	.07	.01	-.10	-.34	.12	-.13
11. Highly inferential	.17	-.04	.85*	.03	-.07	.22	.06	.05	-.01	-.03
12. Fairly simple inference	.41*	-.03	-.60*	-.35	-.09	.01	.04	-.32	.22	-.04
13. Seen in text	.10	-.18	.10	-.10	.81*	-.03	-.06	-.07	-.33	-.06
14. Inferential	.68*	-.32	.13	-.16	.04	-.19	-.11	-.39	-.08	-.23
15. Inferential	-.05	-.04	.08	-.04	-.02	.82*	-.02	.18	-.23	-.24
16. Seen in text	.16	.02	.01	.83*	.04	-.20	-.13	-.06	.00	.06
17. Fairly simple inference	.29	.13	.22	.04	-.05	.75*	-.06	-.24	.23	.30
18. Very simple inference	-.00	-.18	-.38	.09	-.22	-.43	.23	-.02	.43	-.28
19. Fairly simple inference	.39*	-.13	.14	.44*	.40	.24	.39	.19	-.01	-.01
20. Inferential	.39*	.17	.42	.21	.13	.24	-.03	.24	-.08	-.38
21. Very simple inference	-.02	-.02	-.07	-.16	-.21	-.12	.83*	-.08	-.13	.16
22. Fairly simple inference	.14	.38	.21	-.07	.00	.25	.41	.48	.02	-.25
23. Fairly simple inference	.41*	.41	.21	-.23	.18	-.12	.30	.37	.00	.14
24. Seen in text	-.15	.74*	-.11	-.24	-.29	.06	-.04	-.10	-.27	.08
25. Total of reading test	.82*	.23	.24	.01	.24	.23	.23	.10	.01	-.12
26. Academic mark	.86*	.08	.16	.17	.05	.07	.07	-.03	.11	-.12

TABLE 6

Fourth-Year Arts, Arabic. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places)

* Significant

Variate	Component Number									
	1	2	3	4	5	6	7	8	9	10
1. Speed	-.01	.01	.09	.87*	.11	-.01	-.11	.21	-.03	-.00
2. Complex	.02	.03	-.05	.24	-.02	-.08	.01	.84*	.02	-.12
3. Simple	-.04	.05	-.06	-.06	.05	-.26	.87*	.01	.04	-.03
4. Very simple	.02	-.12	.05	-.03	-.05	.90*	-.11	-.06	.07	-.12
5. Complex	.04	-.14	-.21	-.01	.04	.20	.64*	-.11	.29	.37
6. Very complex	-.11	-.28	.43*	.29	.43*	.21	.29	-.26	.09	-.33
7. Simple	-.03	.78*	.21	-.18	.14	-.15	.17	-.00	.04	-.13
8. Complex	.06	.08	-.03	.03	.88*	-.07	.03	.08	.11	.04
9. Very complex	-.33*	.36*	.21	.46*	.15	-.07	.08	.23	.23	.38
10. Inferential	-.01	-.29	.28	-.21	-.51*	.06	.54*	.20	.11	-.07
11. Highly inferential	.23	-.08	.05	-.37	.09	-.33	-.18	-.08	.57*	.25
12. Fairly simple inference	-.20	-.10	-.11	.00	.01	-.14	.09	-.20	.03	.84*
13. Seen in text	.33*	.41*	.31	-.08	-.39*	.52*	-.08	.06	.05	.09
14. Inferential	-.37*	.12	.13	-.28	.24	.36*	-.03	.32	.54*	-.16
15. Inferential	.05	-.07	-.49	-.14	-.00	.11	.01	-.06	.73*	.17
16. Seen in text	.01	.57*	-.16	.43*	-.33	-.08	-.15	.02	-.07	-.10
17. Fairly simple inference	-.31*	.16	.03	-.04	-.30	-.35	.09	-.48*	.38*	.23
18. Very simple inference	.05	-.07	.93*	.04	-.09	.07	-.12	-.05	.05	-.07
19. Fairly simple inference	.19	.07	-.05	.10	-.03	-.17	.07	-.15	.72*	-.31
20. Inferential	.76*	.02	.26	-.13	-.13	-.16	-.23	.13	.20	-.07
21. Very simple inference	.16	.69*	-.19	.20	.13	.38	-.02	-.20	-.01	.04
22. Fairly simple inference	.77*	.11	-.12	-.07	.00	.11	.08	-.24	.26	-.18
23. Fairly simple inference	.81*	.13	-.01	.06	.13	.11	.05	.14	.05	-.03
24. Seen in text	.27	.66*	-.16	.07	.01	-.13	-.29	.20	.21	.01
25. Total of Reading Test	.32*	.15	.27	.10	.08	.15	.26	.09	.81*	.10
26. Academic Mark	.13	.09	.43*	.11	.11	.36	.25	.15	.64*	.23

Interpretation of Unrotated Components

Fourth-Year Social Studies

Component 1

It accounts for 28.57 per cent of the English variance and 18.49 of the Arabic variance.

English: Since the highest loading is that of the total of the reading test and since most of the loadings are significant and positive, the component represents a general reading ability. There is a notable relationship between the loading of the total of the reading test (.95) and the loading of the students' academic mark (.86).

Arabic: The Arabic component is also a representative of general reading ability. The highest loading of the reading test is that of item 25, the total of the test. Items 4(-.33, very simple recognition), 14 (-.31, fairly simple inference) and 21 (-.31, fairly simple inference) seem to be too simple in Arabic to be considered as reading skills at such an advanced level. Perhaps language in the English test has an effect upon them. They seemed, though with almost zero loadings, slightly more complex.

Component 2

It accounts for 10.42 per cent of the English variance and 10.02 per cent of the Arabic variance.

TABLE 7 - Fourth-Year Social Studies

Unrotated Components Loadings and Communalities
(Numbers are rounded to Two Decimal Places)

Loadings below 30 are not significant.

N = 84. 42 English. 42 Arabic. * = Significant

Variate	English Components 1	2	3	4	5	6	7	8	9	10	Communalities	Arabic Components 1	2	3	4	5	6	7	8	9	10	Communalities
1. Speed	.32*	.50*	.22	.27	.35*	.34*	-.00	-.07	-.18	-.02	.75	.12	-.55*	-.05	-.20	.32*	.49*	.17	-.22	.05	.32*	.88
Recognition:																						
2. Complex	.38*	.28	-.16	.10	.42*	.13	-.28	-.06	.53*	.09	.82	-.26	-.25	.55*	-.40*	-.19	-.49*	.13	.21	-.02	.07	.94
3. Simple	.24	-.24	.12	-.09	-.15	.64*	.25	-.32*	.11	.03	.75	-.17	.28	.32*	-.24	.35*	.04	-.25	-.11	-.55*	-.05	.77
4. Very simple	.22	.07	-.00	.71*	.03	-.13	-.24	-.10	.13	-.13	.68	-.33*	.16	-.38*	-.27	-.06	-.39*	.45*	.03	.12	.00	.73
5. Complex	.38*	.31*	-.26	-.51*	.25	.08	.06	.15	.14	.37*	.82	.12	.22	.16	.10	.13	-.17	.73*	-.20	.21	-.29	.85
6. Very complex	.38*	.47*	.31*	-.03	.22	-.41*	.12	-.19	-.17	.14	.78	.22	.19	.53*	.10	.49*	-.12	-.19	-.11	.21	.19	.76
7. Simple	.69*	-.29	-.35*	.10	.10	-.04	.06	-.02	-.05	-.13	.73	.46*	.15	-.24	-.09	.24	.17	-.04	.01	.23	.38*	.59
8. Complex	.54*	.03	-.46*	-.04	.11	.09	-.20	-.19	-.27	.02	.68	.20	.36*	-.29	.19	.13	-.39*	.16	-.30*	-.40*	.22	.78
9. Very complex	.26	.52*	.06	-.06	.22	-.10	.45*	-.25	.14	-.34*	.80	.25	.03	-.55*	-.21	.64*	.07	-.02	.13	-.10	-.12	.87
Comprehension:																						
10. Highly inferential	.76*	.04	.35*	-.07	-.19	.09	.19	.01	-.01	.01	.79	.70*	.10	.01	.09	-.27	-.17	-.39*	-.01	-.05	.13	.78
11. Inferential	.82*	-.21	.09	-.12	-.14	-.05	-.02	-.04	-.13	-.09	.79	.30*	-.38*	-.17	.38*	-.06	.55*	.24	-.20	.01	-.14	.83
12. Very simple inference	-.23	.44*	-.30*	.45*	-.16	.13	.24	-.03	-.12	.42*	.84	.18	-.26	.06	.27	.40*	-.28	-.17	.59*	.08	-.28	.89
13. Inferential	.81*	-.27	-.04	-.27	.05	.08	.05	.19	-.17	-.15	.90	.29	-.32*	.24	-.25	.17	-.34*	-.07	.02	.57*	.13	.80
14. Fairly simple inference	.01	.44*	.02	.17	.00	.32*	.06	.67*	-.05	-.36*	.91	-.31*	.25	-.53*	-.41*	-.09	-.01	-.06	.30*	.08	.05	.72
15. Very simple inference	.00	-.43*	-.47*	.25	.43*	-.17	.22	-.01	.00	-.21	.77	.28	.46*	.43*	-.17	-.19	.29	.08	.13	.10	-.18	.68
16. Fairly simple inference	.66*	-.23	-.16	.19	-.35*	.08	.11	-.23	.01	-.11	.78	.52*	.65*	.03	-.19	.01	-.01	.09	-.19	.08	-.05	.78
17. Inferential	.72*	-.16	.03	-.06	.21	-.22	-.02	.18	-.34*	.16	.82	.03	.39*	.12	-.32*	.05	.48*	-.13	.07	.07	-.32*	.64
18. Seen in text	.08	.37*	-.19	-.51*	-.09	.00	-.43*	-.33*	.10	-.27	.82	-.17	.13	.58*	-.22	-.11	.03	.28	.23	-.21	.36*	.75
19. Highly inferential	.65*	-.43*	.17	.18	-.04	-.14	.18	-.01	.31*	.19	.85	.63*	.15	-.00	.49*	-.26	-.07	.05	.30*	-.09	.04	.83
20. Fairly simple inference	.39*	-.31*	.61*	.01	.11	-.10	-.18	.17	.35*	.01	.83	.16	-.51*	.03	-.39*	-.24	-.28	-.12	-.45*	-.09	-.09	.81
21. Fairly simple inference	-.14	-.08	.62*	.18	.16	.14	-.39*	-.23	-.33*	.01	.80	-.31*	.11	.19	.19	-.01	-.12	-.37*	-.50*	.23	-.25	.70
22. Highly inferential	.48*	.10	-.35*	.18	-.43*	.08	-.37*	.17	.05	.10	.76	.76*	-.24	.08	.23	-.24	.03	.10	.09	-.09	.06	.78
23. Inferential	.69*	.40*	.26	-.03	-.28	.01	.13	.10	.06	.04	.82	.31*	-.56*	.22	-.20	.22	-.17	.17	.06	-.35*	-.28	.81
24. Inferential	.29	.49*	-.04	-.07	-.41	-.48*	-.01	-.02	.04	-.11	.74	.44*	-.14	-.38*	-.49*	-.38*	.00	-.21	.05	.01	-.11	.80
25. Total of Reading Test	.95*	.15	-.04	.11	.09	.12	-.01	-.05	.00	-.02	.96	.90*	-.01	.07	-.30*	.03	-.09	.10	-.04	-.03	-.10	.94
26. Academic Mark	.86*	.02	-.08	.06	.12	.01	-.18	.09	-.05	.10	.82	.92*	.14	.04	-.17	.07	-.01	.04	-.07	-.02	-.01	.91
Percentage of variance	23.57	10.42	7.92	6.39	5.52	4.87	4.65	4.34	3.93	3.36		18.49	10.02	9.38	7.64	6.54	6.16	5.83	5.43	4.75	3.91	
Total Percentage of Variance											79.96											79.15

English: The speed-recognition test grouped together items 1 (.50, speed), 5 (.31, complex recognition), 6 (.47, very complex recognition) and 9 (.52, very complex recognition). Item 5 is partially separated from the rest. Items 12 (.44, very simple inference), 14 (.44, fairly simple inference), 18 (.37, seen in text), 23 (.40, inferential), and 24 (.49, inferential) are grouped together. The grouping of the last two ftems with the others seems rather strange, and difficult to interpret. The other three inferential items' loadings, though not significant, are negative. Two of the highly inferential items' loadings are near zero; but one, item 19, is negatively significant (-.43). Two more items have negatively significant loadings (-.43 and -.31). These loadings belong to item 15, very simple inference, and item 20, fairly simple inference.

Component 2 proved to be rather complicated for straight-forward interpretation in all the groups, but here seems to be the most complicated of all the others.

Certainly the rotated component will clarify this complexity.

Arabic: In the speed-recognition test, item 1 (-.55, speed) is separated from item 8 (.36, complex recognition). But speed is grouped with four of the comprehension items. These are items 11 (-.38, inferential), 13 (-.32, inferential), 20 (-.51, fairly simple inference) and 23 (-.56, inferential).

The second group in this bipolar component consists of item 15 (.46, very simple inference), 16 (.65, fairly simple inference), and 17 (.39, inferential) of the comprehension test and item 8 (.36, complex recognition) of the speed recognition test. Within these two main groups, items are partially separated.

Since the Arabic component is much clearer than the English component, language could be the cause of the complexity of the English component.

Component 3

It accounts for 7.92 per cent and 9.38 per cent of the English variance and Arabic variance respectively.

English: In the speed-recognition part of the test, items 7 (-.35, simple recognition) and 8 (-.46, complex recognition) are grouped together to show the requirement of an ability which is different from that required by item 6 (.31, very complex recognition).

This last item is grouped with items 10 (.35, highly inferential) and 22 (.35, highly inferential) of the comprehension test. Although items 20 (.61, fairly simple inference) and 21 (.62, fairly simple inference) which are grouped together, share the nature of the highly inferential items, but the grouping is not complete. They are partially separated. The very simple

inferential items 12 and 15 (-.30 and -.47) are grouped together and at the same time separated from the rest.

Arabic: The speed-recognition test grouped the complex, the simple and the very complex items together and separated them from the very simple recognition item 4 (-.38).

The group of items 2 (.55, complex recognition), 6 (.53, very complex recognition), and 9 (.55, very complex recognition) are partially separated from item 3 (.32, simple recognition).

In the comprehension test items 14 (-.53, fairly simple inference) and 24 (-.38, inferential), are grouped together, though partially separated, to show the existence of an ability which is different from that required by items 15 (.43, very simple inference) and 18 (.58, seen in text). These last two loadings are also partially separated.

Component 4

The percentage of variance accounted for by this component is 6.39 of the English component and 7.64 of the Arabic component.

English: Item 4 (.71, very simple recognition) shows an ability which is different from that of item 5 (-.51, complex recognition).

Items 12 (.45, very simple inference), and 18 (-.51, seen in text) of the comprehension test require two different types of ability.

Arabic: The only significant loading in the speed recognition test is that of item 2 (-.40, complex recognition).

In the comprehension test, five items, though partially separated from each other, are grouped together to represent abilities which are in a way similar. These, which are items 14 (-.41, fairly simple inference), 17 (-.32, inferential), 20 (-.39, fairly simple inference) and 24 (-.49, inferential), are separated from items 11 (.38, inferential), 19 (.49, highly inferential). The total test's loading (-.30) shares the nature of the first group.

Component 5

The percentage of variance accounted for by this component is 5.52 of the English variance and 6.54 of the Arabic variance. This component separates the speed-recognition test from the comprehension test in both the English and the Arabic tests.

English: Item 1 (.35, speed) and item 2 (.42, complex recognition) are grouped together. This indicates that the speed of the students' reading, though slow, is the right speed to recognise item 2. But it seems that they should read even more slowly to be able to recognize the very complex recognition item.

In the comprehension test item 15 (.43, very simple inference, multiple-choice) shows an ability which is different from those of items 16 (-.35, fairly simple inference), 22 (-.43, highly inferential) and 24 (-.41, inferential). These last loadings are also separated partially.

Arabic: In the speed-recognition test, items 1 (.32, speed), 3 (.35, simple recognition), 6 (.49, very complex recognition) and 9 (.64, very complex recognition) are, though grouped together, partially separated.

In the comprehension test items 12,(.40, very simple inference) and 24 (-.38, inferential) require two different types of ability. Item 12 is somewhat different from all the other comprehension items. It agrees with speed-recognition items.

Component 6

It accounts for 4.87 per cent of the English variance and 6.16 per cent of the Arabic variance.

English: Items 1 and 3 have positively significant loadings (.34 and .64) which suggest that the speed of reading is suitable for the recognition of simple ideas. Item 6 (-.41, complex recognition) is separated from the two other significant items. It perhaps requires a slower rate of reading and a different ability from that of item 3.

In the comprehension test item 14 (.32, fairly simple inference) is completely separated from item 24 (-.48, inferential), which is partially separated from item 3, of the speed-recognition item.

Arabic: In the speed-recognition test, speed is separated from items 2 (-.49, complex recognition), 4 (-.39, very simple recognition) and 8 (-.39, complex recognition). This suggests that the speed is too slow for

the recognition of these items. Speed shows agreement with some of the inferential items, of the comprehension test.

Items 11 (.55, inferential) and 17 (.48, inferential), are grouped together and, at the same time, separated from item 13 (-.34, inferential) to show that the inferential items differ in the kind of ability they require.

Component 7

This component accounts for 4.65 of the English variance and 5.83 of the Arabic variance.

English: Only item 9 (.45, very complex recognition), out of the speed-recognition items is significant. This indicates that this item requires an ability which is different from all the others.

In the comprehension test a strange combination of items is shown. Items 18 (-.43, seen in text), 21 (-.39, fairly inferential), and 22 (-.37, highly inferential) are, though partially separated, grouped together. This indicates that they require similar abilities, which is unexpected. The rotated components might clear this point up.

Arabic: The two significant loadings (.45, .73) of items 4 and 5 are partially separated to exhibit slightly different abilities.

In the comprehension test items 10 (-.39, highly inferential) and 21 (-.37, fairly inferential are grouped together. This implies that they require the same kind of ability.

Component 8

This component accounts for 4.34 per cent of the English variance and 5.43 per cent of the Arabic variance.

English: The only significant loading in the speed-recognition test is that of item 3 (-.32, simple recognition).

Item 14 (.67, fairly inferential), is singled out. It is separated from item 18 (-.33, seen in text), which measures a similar ability to that of item 3.

Arabic: The only significant loading in the Arabic speed-recognition test belongs to item 8 (-.30, complex recognition).

In the comprehension test, items 12 (.59, very simple inference), 14 (.30, fairly simple inference) and 19 (.30, highly inferential) are grouped together on the one hand, and on the other items 20 (-.45, fairly simple inference) and 21 (-.50, inferential) are grouped together. Each group is completely separated from the other. Loadings within each group are partially separated especially that of item 12 and item 19. Overlapping of items rendered interpretation of the component difficult.

Component 9

It accounts for 3.93 per cent of the English variance and 4.75 per cent of the Arabic variance.

English: Item 2, complex recognition, is the only item in the speed-recognition test, which has a significant loading (.53).

In the comprehension test two groups have been formed. Items 17 (-.34, inferential) and 21 (-.33, fairly simple inferential) are grouped together. They are separated from the second group which combines items 19 (.31, highly inferential) and 20 (.35, fairly simple inference).

Arabic: In the Arabic speed-recognition test items 3 (-.55, simple recognition) and 8 (-.40, complex recognition) are grouped together.

Item 13 (.57, inferential) is separated from item 23 (-.35, also inferential). This indicates that component analysis could detect even the differences which are not clear to the designer of a test. Although these two items are inferential, yet they demand different abilities. This may be so because they belong to different passages.

Component 10

It accounts for 3.36 per cent of the English variance and 3.91 per cent of the Arabic variance.

English: The speed-recognition test shows the difference between complex recognition (item 5) and very complex recognition (item 9). The loadings of the items are .37 and -.34 respectively.

In the comprehension test the difference between item 12 (.42, very simple inference) and item 14 (-.36, fairly simple inference) is revealed.

Arabic: Item 1 (.32, speed) and item 7 (.38, simple recognition) are related to each other.

Item 17 (-.32, inferential) requires an ability which is quite different from that of item 18 (.36, seen in text).

A word about the unexpected combination of items in some components is in order here. These strange combinations might be due to the low reading standard of the students. They are equally bad in reacting to the simple and the complex items.

Interpretation of the Rotated Components (Tables 8 and 9)

Component 1

English: All the twelve significant loadings are positive and contributing to the total of the reading test. Hence this component is representing a general reading ability.

Arabic: Ten loadings in this component are positive. The highest are those of the total of the reading test and the academic mark. Thus, this component stands for a general reading ability also.

Component 2

English: The highest two loadings in this component belong to item 9 (.85, very complex recognition) and item 6 (.63, very complex recognition). The component stands for this item then.

Arabic: The component represents a fairly simple inferential item (multiple choice), since it has the highest loading (.86).

Component 3

English: Item 21, (fairly simple inference), has the highest loading (.84) in this component. This indicates that this item requires an ability which is distinct from all other items. Speed (.49) shows relationship to this item.

Arabic: Two loadings are significantly high in this component. They belong to items 2 (.73, complex recognition) and 18 (.82, seen in text). Hence, it is quite obvious that these two items require similar kinds of ability.

Component 4

English: In this component the very simple recognition (.74) is separated from the complex recognition (-.63).

Arabic: Items 4 (.65, very simple recognition) and 14 (.78, fairly simple inference) are, though partially separated, grouped together to show the requirement of somewhat similar abilities.

Component 5

English: Loading (.80), which belongs to item 15 (very simple inference, multiple choice) is separated from item 23 (-.64, inferential). This

component, then, shows that these two items require two different abilities.

Arabic: Items 6 (.67, complex recognition) and 13 (.74, inferential) are grouped together. They demand similar abilities which are revealed through this component.

Component 6

English: The component represents item 3 (.84, complex recognition) because it has the highest loading in the component.

Arabic: .77 is the highest loading in this component. It is partially related to item 15 (.64, very simple inference). Although loading .77 belongs to item 17, inferential, it is like item 15 multiple choice. They are both separated from item 8 (-.50, complex recognition).

Component 7

English: This component represents an ability which is required by item 18, the answer to which is seen in the reading text, since it has the highest loading (.86).

Arabic: Item 5 (.91, complex recognition) is represented by this component.

Component 8

English: Item 14, fairly inferential, has a very high loading (.94) in this component. Hence, the component exhibits an ability which is required by

item 14.

Arabic: The very simple inferential answer of item 12 (.87) is the dominant loading in this component. Item 23 (.57, fairly simple inference) is partially related to item 12. The component may be regarded as representative of an ability needed to react to item 12.

Component 9

English: Item 2 (.87, complex recognition) is singled out in this component to show a distinctive ability.

Arabic: In this component item 3 (.83, simple recognition) is singled out.

Component 10

English: Item 12 (.83, very simple inference) is separated from item 20 (-.73, fairly simple inference). Thus, this item shows two different abilities.

Arabic: Speed (.90) is the outstanding loading in this component. The component, therefore, represents speed.

Summary

On factorizing the raw scores of four groups of university students, on four reading tests the following are noticed:

1. A general reading component is prominent in the unrotated components. This general reading component consists mainly of the total of the reading test and of the inferential and highly inferential items.

2. The speed recognition test is isolated from the comprehension test in all four groups. Each has distinct abilities which are separately measurable, and which were revealed in the rotated components.

3. The rotated components break down the test items into sub-types of reading ability quite clearly, as it was anticipated. Yet all items show that they have something in common.

4. Component 2 in the unrotated components is irregular and almost shapeless in all the groups. Hence the interpretation of this component is rather vague.

5. The percentage of variance of each of the English components is close to that of the Arabic component.[1] The Social Studies group is an exception. This might be attributed to their low standard in the English language.

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1. See Table 1, Chapter VII, and Tables 1, 4 and 7 of this Appendix.

6. The total percentage of variance of the English and Arabic components is very close.[1] The total percentage of the English and Arabic components for the Arts group is exactly the same (80.84).

7. The pattern of the present components follows the English 'Hierarchical' theory.

8. A strong relationship is established between general reading ability and success in university subjects.

9. Loadings of the speed-recognition items differ from group to group, although the same test was given to all the students. This may be due to the personal background, interest and personality of the groups.

10. Items which are complex in the English version of the speed-recognition test seem easy in the Arabic version. The cause might be attributed to the difference in the nature of the two languages, i.e. length of words, sound-spelling irregularities and so on.[2]

11. The rotated components are more meaningful than the unrotated components. Hence the interpretation of the first components are, on the contrary to the others, straight forward and clear.

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1. Ibid.

2. See Chapter VII.

TABLE 8

Fourth-Year Social Studies, English. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places)

* Significant

Variate	Component Numbers									
	1	2	3	4	5	6	7	8	9	10
1. Speed	.21	.40	.49*	.07	-.11	.10	-.03	.35	.33	.23
2. Complex	.16	.12	-.03	.11	.03	.01	.12	.05	.87*	-.06
3. Simple	.17	.00	.06	-.08	-.06	.84*	-.04	-.07	.01	-.02
4. Very simple	.14	.04	.11	.74*	.03	-.12	-.11	.04	.25	.07
5. Complex	.30*	.12	-.21	-.63*	-.14	-.08	.11	.00	.47*	.12
6. Very complex	.24	.63*	.23	-.06	-.30	-.36	-.06	-.17	.10	.04
7. Simple	.76*	.02	-.21	.14	.27	.07	-.02	-.04	.09	-.04
8. Complex	.66*	-.03	.04	-.01	.15	-.00	.32	-.07	.16	.29
9. Very complex	.06	.85*	-.14	.02	-.03	.08	.13	.13	.12	.03
10. Highly inferential	.61*	.27	.02	-.01	-.45*	.25	-.17	.04	-.00	-.22
11. Inferential	.81*	.07	-.02	.05	-.19	.11	.03	-.09	-.07	-.26
12. Very simple inference	-.21	.05	-.06	.12	-.14	-.00	-.23	.04	.10	.83*
13. Inferential	.86*	.02	-.07	-.20	.02	.12	.01	.13	-.04	-.30
14. Fairly simple inference	-.03	.05	-.04	.02	-.11	-.07	-.04	.94*	.05	.05
15. Very simple inference	.16	.03	-.22	.15	.80*	-.07	-.16	-.07	.02	.02
16. Fairly simple inference	.64*	.03	-.21	.36	-.10	.38	.02	-.18	-.03	.04
17. Inferential	.80*	.06	.14	-.16	-.00	-.26	-.20	-.06	.02	-.11
18. Seen in text	.01	.09	-.04	-.10	-.17	-.02	.86*	-.08	.16	-.06
19. Highly inferential	.53*	.02	-.20	.19	-.10	.18	-.48*	-.30	.18	-.34
20. Fairly simple inference	.20	-.03	.16	.12	-.23	.03	-.31	-.07	.22	-.73*
21. Fairly simple inference	-.12	-.07	.84*	.17	-.09	.03	-.01	-.08	-.10	-.17
22. Highly inferential	.49*	-.39	-.23	.28	-.33	-.05	.18	.13	.19	.21
23. Inferential	.48*	.33	-.09	.04	-.64*	.06	-.06	.18	.11	-.04
24. Inferential	.17	.30	-.32	.30	-.49*	-.37	.20	-.01	.08	.11
25. Total of Reading Test	.84*	.26	.02	.13	-.18	.13	.01	.10	.34	-.00
26. Academic Mark	.82*	.03	.05	.05	-.13	-.06	-.03	.04	.34	-.06

TABLE 9

Fourth-Year Social Studies, Arabic. Varimax Rotation of Component Loadings. (Numbers are rounded to Two Decimal Places)

* Significant

Variate	Component Number									
	1	2	3	4	5	6	7	8	9	10
1. Speed	-.06	.17	.03	-.14	.08	-.04	-.07	-.05	-.06	.90*
2. Complex	-.20	.26	.73*	.01	.10	.13	-.02	.10	-.04	-.00
3. Simple	-.12	.03	.14	-.09	-.02	.18	-.11	.01	.83*	-.05
4. Very simple	-.21	.06	.04	.65*	-.05	-.22	.42	-.10	-.08	-.12
5. Complex	.06	-.06	.02	-.07	.05	.05	.91*	-.01	-.08	-.04
6. Very complex	.12	-.22	.06	-.37	.67*	.06	.07	.05	.30	-.00
7. Simple	.43*	-.25	-.21	.17	.30	.03	-.09	-.14	-.02	.39
8. Complex	.32*	-.14	-.25	.10	-.11	-.50*	.26	-.24	.44	-.13
9. Very complex	.15	-.07	-.52*	.41	.03	.05	.04	.36	.32	.42
10. Highly inferential	.75*	.08	-.13	-.14	.13	-.06	-.32	-.07	-.04	-.23
11. Inferential	.13	.01	-.28	-.45	-.39	.05	.10	.00	-.36	.48
12. Very simple inference	.06	-.15	-.12	-.07	.20	-.08	-.07	.87*	-.07	-.12
13. Inferential	.15	.28	.10	.03	.74*	-.05	.04	.19	-.28	.09
14. Fairly simple inference	-.17	-.09	-.08	.78*	-.11	.12	-.18	-.03	-.03	-.05
15. Very simple inference	.32*	-.16	.28	-.10	.03	.64*	.15	-.12	.02	-.15
16. Fairly simple inference	.58*	-.11	-.15	.12	.17	.34	.31	-.32	.22	-.13
17. Inferential	.01	-.08	-.04	.07	-.04	.77*	-.01	-.07	.17	.03
18. Seen in text	-.01	-.17	.82*	-.01	.03	.03	.06	-.10	.20	.02
19. Highly inferential	.70*	-.33	-.04	-.23	-.18	-.13	-.01	.16	-.22	-.22
20. Fairly simple inference	.09	.86*	.03	-.06	.07	-.18	-.07	-.11	-.02	.05
21. Fairly simple inference	-.40*	.18	-.30	-.35	.25	.09	-.01	-.27	.06	-.39
22. Highly inferential	.73*	.07	.05	-.32	-.12	-.12	-.02	.15	-.27	.12
23. Inferential	.18	.51*	.18	-.18	-.08	-.10	.16	.57*	.19	.24
24. Inferential	.47*	.48*	-.14	.39	-.12	.18	-.29	-.03	-.20	.04
25Total of tests	.84*	.31	-.04	.00	.16	.17	.19	.14	.06	.16
26. Academic Mark	.87*	.12	-.12	-.06	.18	.17	.14	.03	.11	.16